Field testing of the revised South African Paediatric Food-Based Dietary Guidelines among mothers/caregivers of children between the ages of 3-5 years in the Northern Metropole of the City of Cape Town, Western Cape Province, South Africa

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Declaration

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Abstract

INTRODUCTION: While child underweight and wasting in South Africa decreased in early 2000, overweight and obesity are on the rise and stunting has not declined significantly and remains a public health problem. South Africa continues to experience economic and urban development, coupled with the nutrition transition, contributing to malnutrition in all its forms, especially among women and children. Recognising the link between dietary practices and many current South African health issues, Food-Based Dietary Guidelines for all South Africans were developed, by following the accepted international protocol. This was later followed by the development of a series of Paediatric Food-Based Dietary Guidelines (SA PFBDGs) for children between the ages of 0-5 years. The aim of this study was to test the appropriateness and understanding of the SA PFBDGs among mothers/caregivers with children between the ages of 3-5 years, residing in the City of Cape Town, Northern Metropole (Atlantis, Witsand, Du Noon and Blouberg areas) of the Western Cape Province. The study also identified barriers and enablers to the implementation of the SA PFBDGs.

METHODOLOGY: The qualitative study followed a descriptive, cross-sectional design. Focus group discussions (FGDs) were conducted in English, Afrikaans and isiXhosa with eligible, voluntary participants (n=55). FGDs were audio recorded and transcribed and content analyses were performed on the data.

RESULTS: The FGDs revealed detailed, contextually-relevant responses regarding comprehension, acceptability and applicability of the SA PFBDGs in these communities. Study participants had heard of all the guidelines in some form or were to some extent aware of safe, healthy eating habits. Where there was uncertainty, or where some participants claimed not to know about the guidelines or certain food items, fellow participants offered some explanation. Understanding of nutrition among the participants was generally good and they discussed valid concerns within the focus groups, but myths regarding certain foods also existed. Cultural differences and taste preferences, ultimately resulted in poor implementation of their healthy eating knowledge, specifically with the guidelines relating to lean meats and chicken, dry beans, split peas, lentils and soya, salt, fat, and sugar. With regards to dietary variety and fresh fruit and vegetables, obstacles such as availability and financial constraints featured prominently. Understanding nutritional needs of children, supportive communities and education were strong enabling factors supporting the implementation of the SA PFBDGs.

CONCLUSION: This study revealed a general understanding and know-how by mothers/caregivers regarding many of the SA PFBDGs across various environments. There is a need however, to further clarify the understanding of some guidelines, with additional focus on those pertaining to sugar, salt and fat. The design of specific community appropriate SA FBDG educational materials, to complement national actions, could be instrumental in minimising inconsistent messages on young child nutrition and creating a supportive environment for improved nutritional health.

Opsomming

INLEIDING: Terwyl ondergewig en uittering in kinders in Suid-Afrika vroeg in 2000 afgeneem het, het oorgewig en obesiteit toegeneem en dwerggroei het nog nie betekenisvol afgeneem nie en is nog steeds ‘n openbare gesondheidsprobleem. Suid-Afrika ervaar steeds ekonomiese en stedelike ontwikkeling, tesame met die voedingsoorgang wat bydra tot wanvoeding in al sy vorme, spesifiek in vrouens en kinders. Na erkenning van die verbintenis tussen dieëtpraktyke en die veelvoudige huidige gesondheidsprobleme in Suid Afrika, was voedsel-gebaseerde dieëtriglyne (SA VGD) vir alle Suid-Afrikaners ontwikkel deur die internasionale erkende protokol te volg. Dit was later gevolg deur die ontwikkeling van die pediatriese voedsel-gebaseerde dieëtriglyne (SA PVGD) vir kinders tussen die ouderdomme van 0-5 jaar. Die doel van hierdie studie was om die toepaslikheid en begrip van die SA PVGD onder moeders/versorgers van kinders tussen die ouderdomme van 3-5 jaar, wat woonagtig is in Kaapstad se Noordelike Metropool (Atlantis, Witsand, Du Noon en Blouberg areas) in die Wes-Kaap Provinsie, te toets. Die studie het ook hindernisse en faktore wat die SA PVGD implementering kan beïnvloed, geïdentifiseer.

METODES: Hierdie kwalitatiewe studie het ‘n beskrywende, deursnit ontwerp gevolg. Fokusgroepbesprekings (FGB) was gehou in Engels, Afrikaans en isiXhosa deur insluiting van vrywillige, gekose deelnemers (n=55). Oudio-opnames van die FGB is getranskribeer en inhoudsanalise was op die data toegepas.

RESULTATE: Die FGBs het gedetaileerde, kontekstueel relevante response ten opsigte van die begrip, aanvaarbaarheid en toepaslikheid van die SA PVGD in hierdie gemeenskappe aan die lig gebring. Studie deelnemers het al van die riglyne in een of ander vorm gehoor of was tot ‘n mate bewus van veilige, gesonde eetgewoontes. Wanneer daar enige onsekerheid was of wanneer enige van die deelnemers beweer het dat hulle nog nooit van ‘n riglyn of sekere voedselitems gehoor het nie, het mede-deelneemers ’n verduideliking aangebied. Die begrip van voeding onder die deelnemers was in die algemeen goed en hulle het geldige bekommernisse bespreek, maar mites oor sekere kosse was ook genoem. Kulturele verskille en smaakvoorkeure het uiteindelik tot swak implementering van hul gesonde voedingkennis, spesifiek vir die riglyne oor maer vleis en hoender, gedroogde bone, sout, vet, suiker en peulgewasse, lensies en soja gelei. Met betrekking tot dieët verskeidenheid en vars groente en vrugte, was struikelblokke soos beskikbaarheid en finansiële beperkings prominent genoem. Begrip van kinder-voedingsbehoeftes, ondersteunende gemeenskappe en onderrig was belangrike faktore wat die implementering van die SA PVGD kan ondersteun.

AFSLUITING: Hierdie studie het ‘n algemene begrip en kennis van die SA PVGD tussen moeders/versorgers vanuit verskillende omgewings getoon. Daar is egter ‘n behoefte om die begrip van sekere riglyne beter te verduidelik, met addisionele fokus op die suiker, sout en vet riglyne. Die ontwerp van spesifieke gemeenskaps-toepaslike aanbiedings en opvoedkundige materiaal oor die SA PVGD, om nasionale aksies

aan te vul, kan instrumenteel wees om teenstrydige boodskappe oor jong kind voeding te verminder en om 'n ondersteunende omgewing te skep vir verbeterde voedingsgesondheid

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List of abbreviations

AF	Afrikaans Formal
DDS	Dietary Diversity Score
DoH	Department of Health
ECD	Early Childhood Development
EF	English Formal
EHFP	Enhanced Homestead Food Production
EI	English Informal
FANTA	Food and Nutrition Technical Assistance
FAO	Food and Agricultural Organisation
FBDGs	Food-Based Dietary Guidelines
FGB	Fokusgroepbesprekings
FVS	Food Variety Score
INP	Integrated Nutrition Program
IYCN	Infant and Young Child Nutrition
LMICs	Low and Middle Income Countries
MDG	Millennium Development Goals
MRC	Medical Research Council
NCDs	Non-Communicable Disease
NFCS (1999)	National Food Consumption Survey (1999)
NFCS-FB-I (2005)	National Food Consumption Survey Fortification Baseline (2005)
NSSA	Nutrition Society South Africa
PFBDGs	Paediatric Food-Based Dietary Guidelines
SA	South Africa
SADHS	South African Demographic and Health Survey
SAVACG (1994)	South African Vitamin A Consultative Group
SANHANES-1 (2012)	South African Nation Health and Nutrition Examination Survey
SDG	Sustainable Development Goals
SES	Socio-economic status
UNICEF	United Nations Children's Fund
USAID	United States Agency International Development
VGD	Voedsel-gebaseerde Dieëtriglyne
WHO	World Health Organisation
XI	isiXhosa Informal

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Definitions:

- Nutrition transition

  Changes in dietary intake affected by demographic and epidemiological shifts in low income and middle income countries (LMICs) resulting in increasing incidence of diet-related non-communicable diseases (e.g. obesity, heart disease and type 2 diabetes). [1,2]

- Double burden of disease

  The simultaneous presence of over- and under-nutrition.[3]

- Food security

  When "all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life." [2]

- Nutrition security

  The combination of food security, quality of the diet and nutrition sensitive conditions (e.g. hygiene, sanitation, care and access to health services) affecting an individual's ability to live a healthy and productive life. [2]

- Food-based dietary guidelines

  A way of communicating evidence-based nutrition information to entire country populations in the form of food, eating behaviours and food preparation techniques to enable positive dietary behavior change and adoption of a safe, appropriate and adequate diet for individuals. [4]

CHAPTER 1: INTRODUCTION

1.1. Origin of the Food-Based Dietary Guidelines

The concept of Food-Based Dietary Guidelines (FBDGs) was initiated in 1992 at the International Conference on Nutrition held in Rome. The detailed steps for its development were laid out by the Food and Agricultural Organisation (FAO) and World Health Organisation (WHO). The FAO outlined the cyclical nature of the process, which includes developing, revising and improving country-specific FBDGs.[4] Since the development of the South African (SA) FBDGs for individuals 7 years and older in 1997 and the establishment of the proposed Paediatric Food-Based Dietary Guidelines (SA PFBDGs) in 2001, consumer testing has been recommended and undertaken. In 2011, following a review of the evidence, the SA FBDGs were revised accordingly and preliminary SA PFBDGs for 0-6 months, 6-12 months, 12-36 months and 3-5 year age groups were included. Following their publication, consumer testing of the revised SA PFBDGs was suggested if they are to be formally adopted by the South African Department of Health (DoH).[5]

1.2. Purpose of this study

In 2003 the first SA FBDGs for individuals aged 7 years and older were formally adopted by the DoH after undergoing consumer testing.[6] Similarly, the SA PFBDGs will only be officially adopted by the DoH after testing their appropriateness and consumers' understanding. Researchers from the Division of Human Nutrition, Stellenbosch University, have taken initiative to do consumer testing of the SA PFBDGs through a series of studies. At this time, studies of the guidelines for the age groups 0-6; 6-12 and 12-36 months have been completed. This current study completes the testing of the guidelines in the last age group (3-5 years) of the paediatric categories. All the SA PFBDGs have therefore been tested in the Western Cape Province in the three official languages of the province, namely English, Afrikaans and isiXhosa.[7,8] In addition, the messages for the age group 0-36 months have also been tested in Siswati in the Mpumalanga province.[9]

A qualitative research design provides detailed insight into the appropriateness and understanding of the guidelines, taking into consideration the complex environments of consumers. This study will help to recognise barriers and enablers for implementation, serving as the necessary evidence for the DoH to take action and to officially accept and incorporate the SA PFBDGs as part of national health messages and programmes.[5]

1.3. Education and empowerment to improve nutritional status

Well-designed, widely accepted FBDGs can be a powerful tool to educate and empower individuals of various social, economic and geographic backgrounds. This enables individuals to change their dietary behaviour in order to meet their nutrient requirements specific to their age, health status and personal and cultural preferences. Ultimately, multi-sectoral implementation of FBDGs could prove instrumental in eradicating malnutrition, especially amongst children, and non-communicable diseases (NCDs) – two of the biggest public health challenges in South Africa.

It has been suggested that a lack of accurate knowledge regarding nutrition and low availability of nutrient dense foods, among other factors, are key elements leading to both nutritionally inadequate and unhealthy eating habits and in turn the double burden of disease in South Africa. The SA FBDGs, both paediatric and those for older individuals, have been designed for South Africans according to the guidance set forth by the FAO/WHO consultation. Assessing the awareness, comprehension and acceptance of the guidelines has been extremely important in the revision and consequent improvement of the guidelines and supports their use towards addressing nutrition related health matters.[4–6] By researching their comprehensibility and appropriateness, this study aims to extend this acceptance and support for implementation of the SA PFBDGs.

1.4. Consumer testing of the Paediatric Food-Based Dietary Guidelines

Evaluation of the initial SA FBDGs has helped to ensure that the official messages are appropriate and consistent with the most recent scientific knowledge and research. Consumer testing has helped to verify that the guidelines are consistent with and can be used alongside the corresponding Food Guide visual (2013) (Figure 1.1), developed specifically for South Africa as nutritional education resources. Such evaluations allow possible misconceptions to be identified and the SA FBDGs to be revised accordingly. Similar evaluation, to ascertain general comprehension and acceptance of the newly revised SA PFBDGs, will ensure that they are officially adopted as part of South Africa's dietary recommendations, and nutrition and health education.[10] Recent evidence shows that there have not been significant improvements in the nutritional status of South Africans, but few studies have assessed the actual long-term impact of the FBDGs on addressing stunting, obesity and NCDs.[5,11,12] Studies assessing the interpretation and application of the guidelines have highlighted some of the issues hindering progress. Continuous evaluation, reformulating and re-testing are necessary to optimise nutrition education of both the consumers and healthcare workers. These efforts can help achieve the necessary healthy dietary behaviour, especially in environments with limited resources.[6,13]

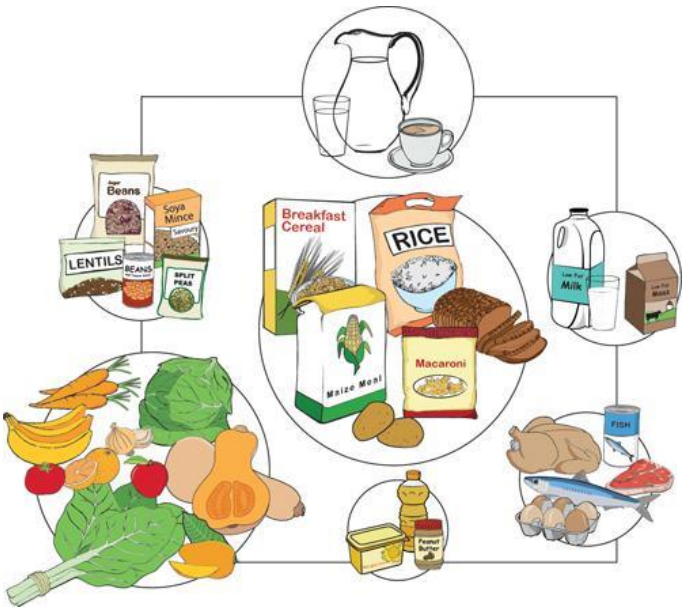

Figure 1.1: *The South African food guide visual (Department of Health, Directorate Nutrition) available from: http://www.fao.org/nutrition/education/food-based-dietary-guidelines/regions/countries/south-africa/en/*

Testing of the SA PFBDGs is important to their effectiveness (2001).[5,6] Qualitative research is necessary to assess whether the messages are suitable and understandable. Research in this area will not only identify barriers to their understanding and implementation but also provides valuable information on how to address misconceptions.[5]

1.5. Thesis outline

The first section provides an introduction into the field of study. Thereafter, more in-depth insight is provided on the global and South African nutrition landscape with a focus on the South African guidelines, specifically the revised SA PFBDGs. Thirdly, the study procedure is described, including study sites, sample populations and applied research methods, training, data collection and analysis procedures. This is followed by a description of the results in the form of responses to each of the SA PFBDGs for the age group and a discussion comparing the responses from the current study with previous studies. Limitations, recommendations and a conclusion follow. Finally, references and addenda are provided.

CHAPTER 2: LITERATURE REVIEW

2. Introduction

Vital to the survival, growth, development and achievement of full human potential, nutrition has risen to the top of the agenda for global health strategies and actions. In many countries, the prevalence of malnutrition has not significantly diminished, despite global efforts. The 2017 Global Nutrition Report confirmed that childhood stunting and anaemia and overweight in women are still prevalent in many regions of the world. The report also shows that levels of hunger and obesity have increased since 2015. Micronutrient deficiencies and wasting continue to be of public health concern in some contexts, and the incidence of NCDs is on the rise with low probability of decreasing in the near future.[14]

2.1.1. Global child malnutrition

Exclusive breastfeeding for the first six months of a child's life is recognised as evidence-based and best practice. After six months, global advice is that complementary feeding should commence in a manner that is "*timely, adequate and safe… ensuring the child's nutritional needs are met"* while continued breastfeeding up to two years of age or beyond is recommended.[15] The period from conception up until two years of age has become widely recognised as the most crucial window of opportunity to ensure optimal weight gain, growth and development and this is commonly referred to as the first 1000 days.[16]

The growth and development of infants and young children is largely dependent on feeding practices exercised by mothers/caregivers and is related to the accessibility to and choice of food which, in turn, can be affected by urbanisation and the nutrition transition. Worldwide, approximately only 60% of children aged 6-8 months receive complementary foods, which contributes significantly to global child under-nutrition as, at this period, breastfeeding alone does not supply sufficient nutrients. In addition, globally only ~16% of 6-23-month-old children are eating a 'minimally acceptable diet', measured by the combination of meal frequency and dietary diversity.[17] Just as the late introduction of complementary feeding is problematic, so too is the early introduction and it has also been reported that almost one in three 4-5-month-old infants were already receiving solid foods. Regions with the lowest scores for amount of food eaten and frequency of meals for 6-23-month-old children are the same as those with the highest percentages of stunting, namely South Asia, Western and Central Africa and Eastern and Southern Africa.[16] This highlights the vast global differences in complementary feeding practices but all with negative consequences for the child.

Studies in Nepal and Ethiopia conclude that extended breastfeeding with inadequate complementary feeding increases the risk of stunting as the child gets older.[18,19] Indonesian and Tanzanian studies found stunting to be more common in areas with sub-standard sanitation, hygiene and low-quality drinking water. Higher stunting rates were observed in households of low socio-economic status in both studies.[20,21] Studies in Cambodia reiterate the role of higher household income and the mother's educational status as positively affecting child nutritional status, and emphasise the importance of not educating mothers/caregivers solely on dietary intake, but also on hygiene and safety.[22]

Infant and young child feeding (IYCF) indicators were recently re-examined by the United Nations Children's Fund (UNICEF), World Health Organisation (WHO), United States Agency for International Development (USAID) and Food and Nutrition Technical Assistance (FANTA) and they drew attention to the need to re-evaluate the sufficiency and effectiveness of the 2008 indicators (minimum diet diversity, minimum meal frequency and the minimum acceptable diet). For the first time, the development of clear indicators for pre-school (24-59 months) and school-age children (>5 years) was also highlighted, especially as it was stated that it is not easy to monitor dietary intake of pre-school children in whom the transition to self-sufficiency is well underway. In addition, obesity, fruit and vegetable consumption, and animal and dairy products were discussed as important themes in need of clarification and action. Food marketing and health promotion were also identified as key influencing factors warranting further exploration.[23]

Recently, statistics of young child nutrition and health were published in a Lancet series, which highlight the complex interplay of key factors shaping Early Childhood Development (ECD).[24] The 2017 'Advancing Early Childhood Development' series focuses on factors influencing infant and child growth and development. Poverty and stunting have been associated with the failure of those affected to reach their full potential throughout school years, adolescence and their adult lives. The imperative role of adequate nutrition in early years seems clearer now more than ever, allowing us to fully appreciate the devastating impact of neglecting early childhood growth and development needs on a country's economy (lower incomes and national gross domestic product).[24] Inversely, levels of overweight and obesity among children aged 2-5 years are rising, with 18.9% and 4.9% of girls now classified as overweight or obese and 17.5% and 4.4% of boys categorised as overweight or obese, respectively.[25] Integrated health, nutrition and education services have been identified as underlying factors affecting early childhood development. In addition, it is well established that interventions designed within a broader, dynamic framework to provide support from preconception right through to early childhood have the power to enable children to reach their full potential.[25]

Maternal over- or under-nutrition potentially affects foetal growth and development, having been associated with childhood stunting and risk of childhood obesity and chronic consequences later in life.[26]

Looking at studies conducted in Sub-Saharan Africa (South Africa representing 51%), Keino et al.[27] found over-nutrition in children to be largely dependent on factors such as maternal age, occupation and nutritional status, and household demographics. Stunting was strongly linked to economic factors and found to be more common among children whose mothers were not working (possibly due to lower education level and income), whereas over-nutrition was more common for those with working mothers. Early cessation of breastfeeding and formula intake were associated with overweight infants in the review.[27] Additional risk factors were shorter periods of exclusive breastfeeding and inappropriate, unsafe complementary feeding practices. The living environment and resources available to mothers and children were related to both stunting and overweight.[27] The nutritional status and education of mothers-to-be is highly significant and optimising both is considered an important pathway to reducing the incidence of malnutrition, both excess and deficient forms, in infants and young children, and breaking the cycle of predisposition to malnutrition.[18,26,27]

Global nutritional health strategies have previously been more oriented towards combating nutritional deficits. Focus and energy is, however, being redirected towards providing actions and strategies to include the other side of malnutrition, i.e. over-nutrition and NCDs, with more preventative measures and nutrition-sensitive approaches. For example, the 2030 Sustainable Development Agenda identifies the interdependent nature of economic, social and environmental influences and has included *'Ensure healthy lives and promote well-being for all at all ages'- (Global Nutrition Report Stakeholder Group, Independent Expert Group)*[14] as an overarching health goal, recognising the fundamental role of nutrition and health in improving global development as well as the key roles of economic growth, poverty and inequity in nutrition. The WHO Integrated Management of Childhood Illness (IMCI) programme will now also include early detection and prevention of overweight or obesity in addition to underweight, micronutrient deficiencies and infectious diseases among young children to facilitate timely interventions.[28] Globally, nutrition of pre-school aged children (2-5 years), in whom stunting incidence has risen and research is lacking, is also gaining attention.[23]

2.1.2. Previous and current global strategies to address malnutrition

In terms of overall human health and development, the Millennium Development Goals (MDGs), developed in 2000, consisted of eight goals for world development, and leaders from 189 countries committed their nations to these goals. Health was central to the MDGs and nutrition was recognised as integral to health and other goals. However, only one indicator (prevalence of underweight in children under five years of age) was specifically devoted to addressing child malnutrition in MDG 1: '*Eradicate extreme poverty and hunger.*'[29] The MDGs did, however, manage to provide a platform for more developed countries to assist low and middle income countries to achieve targets through goal number eight: '*Global partnership for*

development.' [29,30] The MDGs succeeded in drawing attention to the importance of global and multi-sectorial collaboration to improve human development and concurrently provided a framework for the monitoring and accountability of progress and actions. Notable advancement towards certain goals, by some countries, was achieved although no country achieved all the goals within five years (2000-2015). MDG accomplishments included progress in the fight against infectious diseases and overall reduction of child and maternal mortality, despite considerable inequality remaining within countries, particularly for individuals with limited healthcare access. The MDGs failed to include disasters and conflict, disability, mental health, epidemic and non-communicable diseases among other important factors. Unfortunately, by providing sector-specific goals, the MDGs managed to promote a more vertical approach rather than strengthening collaborative, inter-dependent efforts.[31]

In the 2013 Lancet series on Maternal and Child Nutrition, Ruel et al.[32] outlined the significance of broader national and global strategies and explained their potential to address underlying causes of malnutrition and to positively affect societies, economies and development. These strategies are referred to as "nutrition sensitive interventions". Protecting nutrition during economic and environmental unpredictability (e.g. fluctuating food prices and food security), high rates of urbanisation and population growth, posing as significant threats to human survival resources, were recognised as vital and requiring a multi-sectorial approach. Ruel et al. further reviewed the bearing of different sectors on nutrition, highlighting the connection between agriculture, education, social safety and the environment in which young children are raised, namely 'nutrition-sensitive' approaches and their ability to affect target populations and 'nutrition specific' programmes that counteract malnutrition directly.[32] Therefore, multi-sectorial collaboration is necessary to address immediate and underlying causes of malnutrition which, in turn, are linked to effectively reaching sector-specific goals. Ultimately; support from multiple sectors can improve early living conditions for children, thereby enhancing effectiveness of nutrition interventions for child health and maximising individual potential later in life.[32]

Following the Lancet series, the unfinished business and shortfalls of the MDGs were included in the Sustainable Development Goals (SDGs; 2015-2030) which were collaboratively formulated and oblige various countries to foster interlinked development in the economic, social and environmental spheres and to *'leave no one behind*'.[31] Adopted by 193 countries in 2015 to initiate a universal and integrated approach, the SDGs, consisting of 17 goals and 230 indicators, provide a framework for the Decade of Action on Nutrition (2016-2025). Nutrition is recognised as a vital catalyst for the achievement of several SDGs. The fact that nutrition is essential for human development and overall health, emphasises its impact on economic development and health costs, which together with other factors, influences progress toward the SDGs. Equally, achieving SDGs related to underlying causes of malnutrition will support ending all forms of malnutrition. Addressing underlying factors, from sustainable food production and basic infrastructure to

health promotion, equity and inclusion, peace and stability via economic, social and environmental integrated approaches seems to be the best way to end malnutrition.[14,33]

Global strategies that have been developed specifically to address malnutrition in women and children, include the initial Global Strategy on Infant and Young Child Feeding (2003),[15] the Comprehensive Implementation Plan on Maternal, Infant and Young Child Nutrition 2012-2025[34] and the Global Strategy for Women's, Children's and Adolescents' Health 2016-2030.[35] The Comprehensive Implementation Plan on Maternal, Infant and Young Child Nutrition 2012-2025, adopted by the 2012 World Health Assembly, includes in its targets a 40% decrease in stunting; the prevention of the anticipated doubling in the prevalence of overweight children younger than five years of age by 2025 and; halving the prevalence of maternal anaemia.[34] The plan has positively directed political awareness towards broader nutrition-sensitive strategies, and is designed to advocate for multi-sectoral actions across government, civil society and private sectors that can be taken to optimise health and reach global nutrition goals through improving human and financial capacity to optimise maternal, infant and young child nutrition. The plan also supports greater investments in nutrition to significantly reduce child deaths (to which malnutrition contributes significantly at an estimated 35% in 2010) and has acknowledged progress as well as key elements which still need to be addressed in the fight against global malnutrition of all forms. By proposing global nutrition actions and targets for 2025, the plan aims to assist countries in reducing multidimensional global malnutrition problems; emphasising the need for a life-course approach (providing continuous support after the first 1000 days throughout childhood, adolescent and adult life) and for mainstreaming nutrition as part of national development policies, among its recommendations.[34]

Similarly, the Global Strategy for Women's, Children's and Adolescents' Health 2016-2030 is aligned with the SDGs and is directed towards the realisation of women and children's right to reduce preventable deaths. Inspired by the achievements and recognition by the 'Every woman, every child' movement, there is now an additional focus on worldwide equity and the role of adolescents for improving health of future generations.[31,35] The Global Strategy for Women's, Children's and Adolescent's Health has widened the focus to specifically address adolescent health in an effort to improve health education and behaviours of parents-to-be.[35]

The establishment (2009) and growth of the Scaling Up Nutrition (SUN) movement highlights the global political concern regarding malnutrition and governments commitments to addressing it. The first strategic plan (2012-2016) was revised recently for the 2016-2020 period. The SUN movement continues to strive for an end to malnutrition through advocating the importance of national and global political, multi-sectoral collaboration to ensure that mothers and children are empowered and enabled to fulfil their basic rights to

nutrition and health in the 50 countries that have joined the movement. [36] Nutrition for Growth (N4G) is another global initiative aimed to increase investments in solutions to fight malnutrition.[34]

2.1.3. Nutritional status of South African women and children

As an upper-middle-income country,[37] South Africa is experiencing economic and urban development, coupled with the nutrition transition, giving rise to a complex national malnutrition profile. Prompted by socio-economic change and characterised by rising intakes of foods from animal sources and nutrient-deficient convenience foods in conjunction with lower intake of vegetables and legumes, the nutrition transition is one of the biggest challenges for South African nutritional health.[38] Rapid development and urbanisation, particularly in South Asia, Latin America and Southern Africa, including South Africa, emphasises the complexity of food, and nutrition security as the problem is no longer simply one of under-nutrition in rural settings, but is becoming more prominent in peri-urban and poorer urban areas.[39]

The second South African Demographic and Health Survey (SADHS) in 2003[40] reported young children's nutritional status via interpretation of anthropometry and clinical tests. The SADHS found stunting, underweight and wasting of young children to be at 27%, 12% and 5%, respectively. These percentages showed an increase from previous national surveys and presented medium severity public health problems.[41] The relationship between maternal education and stunted children was evident in the SADHS and other national surveys.[40,42,43]

National studies show fundamental nutrition-related health risks among South African infants and young children. Since the early 1990s, an estimated 2.3-2.5 million South Africans were affected by under-nutrition and the figures were highest amongst children between the ages of 0-12 years. At the same time, 28.5% of the county's mortality was already attributable to chronic diseases of lifestyle, highlighting South Africa's precarious public health profile, partly due to the nutrition transition.[6]

The South African Vitamin A Consultative Group (SAVACG) in 1994[42] and the National Food Consumption Survey (NFCS) in 1999[43] included children between 0-9 years of age. Both studies showed stunting, underweight, and vitamin A and iron deficiencies as significant health issues influenced by nutrition. Inadequate micronutrient and energy intakes were evident, especially among the 1-3-year-old children in rural or commercial farming areas. On the other hand, increasing overweight and obesity as well as an increasing number of children presenting with early risk factors for NCDs had already been noted.[43] The findings of widespread micronutrient deficiencies in the NFCS resulted in the food fortification legislation in 2003 to ensure that maize and wheat bread flour are fortified with vitamin A, iron, zinc, folic acid, vitamins

B_1, B_2, B_3 and B_6.[43] This showcased the potential effect, on setting policy and legislation, of collecting national nutrition data. According to recommendations by the NFCS, the National Food Consumption Study Fortification Baseline I (NFCS-FB-I) was carried out in 2005[44] as a baseline study subsequent to mandatory food fortification, to monitor and evaluate the response to food fortification and population food consumption behaviours. The objectives of the NFCS-FB-I (2005) included updating hunger statistics; gathering data for children (aged 1-9 years) and women (aged 16-35 years); and evaluating the awareness and understanding of food fortification and efficacy of micronutrient fortification. The survey reaffirmed the prevalence of childhood stunting (~20%) and underweight (~10%), rising percentages of overweight (10%) and obesity (4%) together with micronutrient deficiencies among women (~25% with vitamin A deficiency and ~20% with poor iron status) and children (~66% with vitamin A deficiency, ~14% with poor iron status and ~45% with poor zinc status).[44] These contrasting forms of malnutrition contribute substantially toward the country's economic milieu as health costs continue to rise with the burden of NCDs together with relentless infectious diseases, maternal and child health, rising violence and injury resulting in what is referred to as South Africa's 'quadruple burden of disease.'[1]

The South African National Health and Nutrition Examination Survey (SANHANES-1, 2012)[11] provided a comprehensive review of the country's changing health and nutrition picture and its indicators, providing a basis for developing preventative healthcare strategies. With South African households as the participants, cross-sectional and longitudinal study designs were combined and data was gathered via questionnaires and clinical examinations for current and prospective analysis. The SANHANES-1 showed that almost 50% of the under-five mortality was a result of under-nutrition. Prevalence of stunting in children remained at medium global severity and was highest for children between the ages of 0-3 years (>25%). Wasting and underweight with respective prevalence of 2.6% and 5.2% confirmed low global prevalence severity.[11,45]

The 2016 SADHS[12] reported on the nutritional status of children under 5 years of age and showed that stunting prevalence had not decreased, remaining above 20% (high global prevalence severity),[46] with severe stunting occurring in 10% of children. Again, maternal income and knowledge were inversely linked with stunting, reiterating the positive impact of improved education and income on stunting reduction. According to 2016 SADHS data, 13% of South African children under five years of age had increased weight for height. Compared with global overweight statistic of 6.1%, this represents a high global prevalence severity[46] and is cause for concern, and also requires strategies to address over-nutrition. Figure 2.1 represents the percentages of stunting, wasting and underweight in children up to 9 years from 1994 to 2016, while figure 2.2 and figure 2.3 respectively show the trends in stunting and over-nutrition among children under 5 years of age.[12]

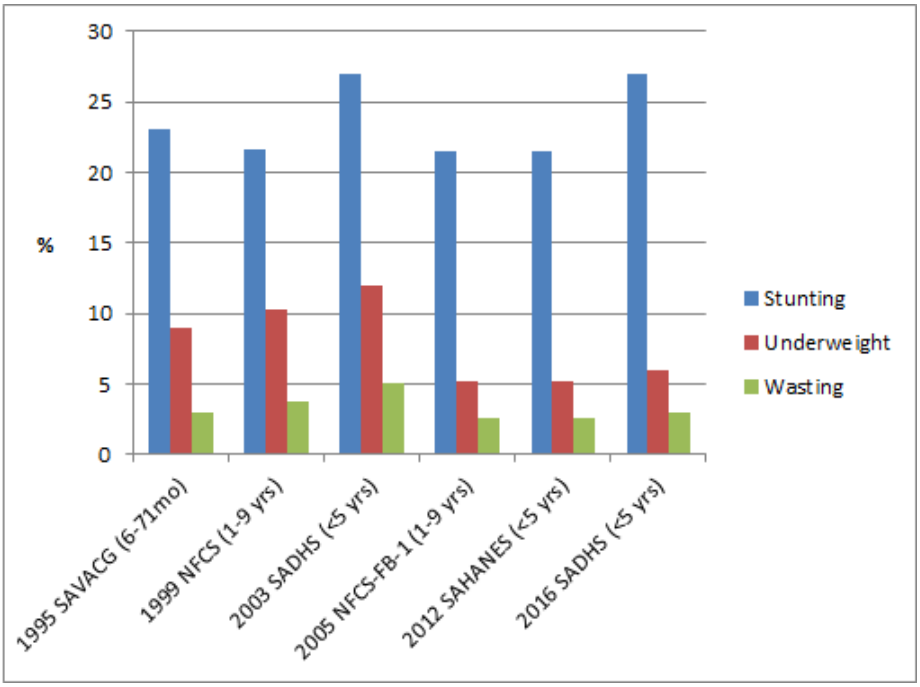

Figure 2.1: Percentages of stunting, underweight and wasting of children up to 9 years from national South African Surveys

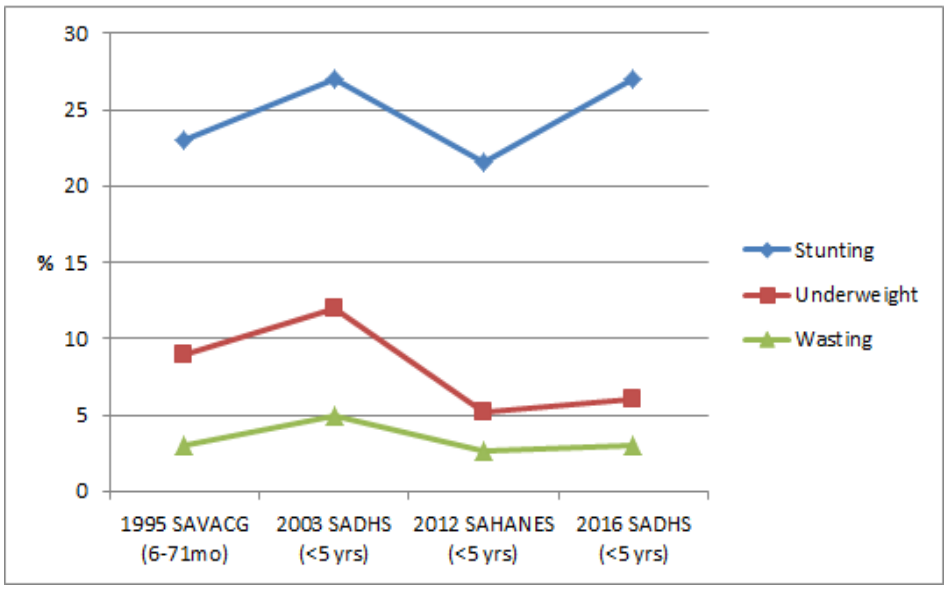

Figure 2.2: Trends in stunting, underweight and wasting among South African children under 5 years of age.

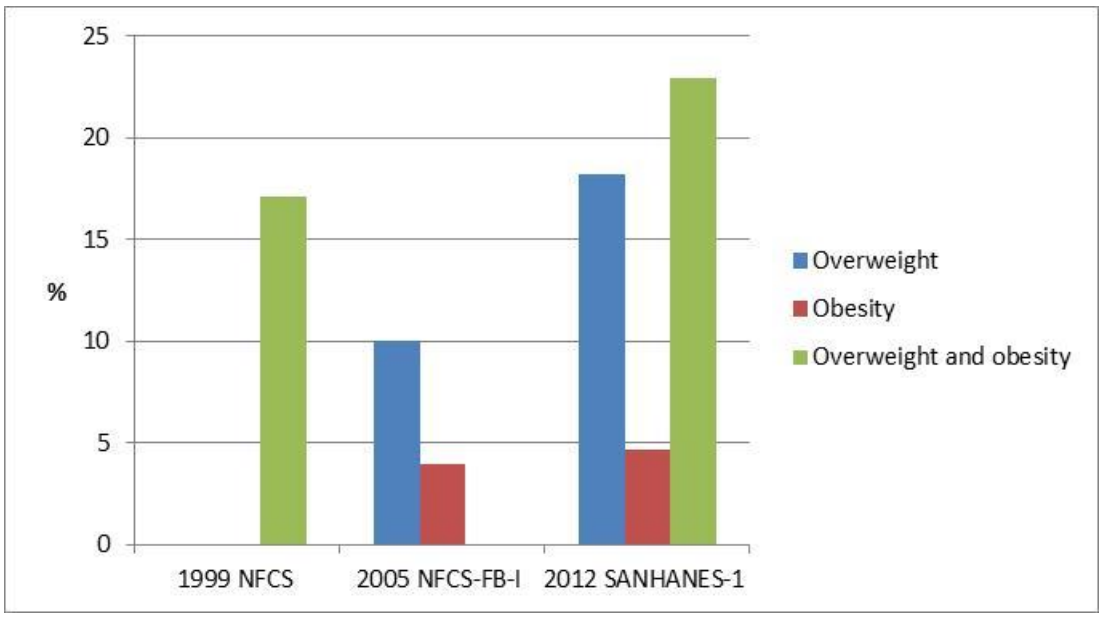

Figure 2.3: Prevalence for overweight and obesity among South African children under 5 years of age

2.1.4. South African strategies for addressing malnutrition

Consistent with the 1977 Alma-Ata Declaration,[47] South Africa established the District Health System which focused more on primary healthcare versus curative approaches. This was an important step towards re-orienting South African health services. In response to the health and nutrition situation in the country, a Nutrition Committee was appointed in 1995 to develop a nutrition strategy for South Africa. As a result, the Integrated Nutrition Program (INP) under the auspices of the National Department of Health was established. The INP is a key strategic health programme which aims to prevent and manage malnutrition as a major contributing factor to morbidity and mortality in the country. The INP established a broad framework to address nutritional problems mainly through policies, legislation, strategies and guidelines. Examples include mandatory salt iodisation (1995), maize meal and wheat flour fortification (2003), the national school nutrition programme (1995), a national vitamin A supplementation programme (2002), and targeted supplementary feeding to malnourished individuals via health facilities (1994).[48–50]

In 2004, the South African Department of Health elaborated 10 priorities (box 2.1) in its Health Sector Strategic Framework (HSSF 2004-9)[51] to work towards improving equal access to healthcare and preventative health actions and identified lack of human resources as the biggest challenge. Consequently, the National Department of Health's Human Resource Plan (HRP)[52] is directed towards increasing human resources in healthcare.

1. Improve governance and management of the National Health System (NHS).
2. Promote healthy lifestyles.
3. Contribute towards human dignity by improving quality of care.
4. Improve management of communicable diseases and non-communicable illnesses.
5. Strengthen primary health care, Emergency Medical Services (EMS) and hospital service delivery systems.
6. Strengthen support services.
7. Human resource planning, development and management.
8. Planning, budgeting and monitoring and evaluation.
9. Prepare and implement legislation.
10. Strengthen international relations.

Box 2.1. 10 priorities from the Health Sector Strategic Framework (HSSF 2004-9)[51]

The Strategic Plan of the National Department of Health, 2010-2013[53] laid out a detailed 10-point plan (box 2.2) to promote national health through improving healthcare in line with the South African Government objectives of the Medium Term Strategic Framework (MTSF 2014-19)[54] guided by the constitution which identified key action areas for uplifting the economy, improving equality and health of all South Africans (box 2.2). The Roadmap for Nutrition for 2013-2017[50] was drawn up recognising the essential role of nutrition in health and this, together with the Strategic Plan for Maternal, Neonatal, Child and Women's Health,[55] stresses the importance of inter-sectorial collaboration in advancing towards globally recognised health and nutrition goals including eradication of hunger, empowering women and reducing child mortality (box 2.3).

10-point Strategic Plan (2009-2014) of the South African National Department of Health	South African Government objectives of the Medium Term Strategic Framework (MTSF 2014-19)
1. Provision of Strategic leadership and creation of a Social Compact for better health outcomes;	1. Speed up economic growth and transform the economy to create decent work and sustainable livelihoods
2. Implementation of a National Health Insurance Plan (NHI);	2. Substantial programme to build economic and social infrastructure
3. Improving Quality of Health Services;	3. Comprehensive rural development strategy linked to land and agrarian reform and food security
4. Overhauling the health care system and improve its management;	4. Strengthen the skills and human resource base
5. Improving Human Resources Planning, Development and Management;	5. Improve the health profile of society
6. Revitalization of physical infrastructure;	6. Intensify the fight against crime and corruption
7. Accelerated implementation of HIV & AIDS and Sexually Transmitted Infections National Strategic Plan 2007-11 and increase focus on TB and other communicable diseases;	7. Build cohesive, caring and sustainable communities
8. Mass mobilisation for better health for the population;	8. Pursue regional development, African advancement and enhanced international co-operation
9. Review of the Drug Policy;	9. Sustainable resource management and use
10. Strengthening Research and Development	10. Build a developmental state including improvement of public services and strengthening democratic institutions.

Box 2.2. 10-point plan of the Strategic Plan (2009-2014) of the South African National Department of Health[54] *aligned with the South African Government objectives of the Medium Term Strategic Framework (MTSF 2014-19)*[54]

Vision: Accessible, caring, high quality health and nutrition services for women, mothers, newborns and children

Guiding principles:

1. Sustained political commitment and supportive leadership
2. Commitment to realizing the human rights of women, mothers, newborns and children.
3. Working with all sectors to improve the lives of women, mothers, newborns and children
4. Provision of an integrated service using a lifecycle approach
5. Optimizing performance of all concerned with MNCWH care
6. Effective communication
7. Empowerment of communities and families, including men
8. Protecting and respecting children
9. Ensuring linkages between the levels of care – community, primary health care and hospital levels

Box 2.3. The vision and guiding principles of the South African Strategic Plan for Maternal, Neonatal, Child and Women's Health (2012-2016)[55]

South Africa has developed well-thought out strategies and interventions, but health deficits and malnutrition remain great challenges. The lack of the desired outcomes has been attributed to a lack of funding, human resources, commitment and collaboration, monitoring and evaluation, along with overall low-scale and inept implementation of programmes.[49] The African Region Landscape Analysis undertaken from 2008-11, highlighted major discrepancies between developing strategies to tackle malnutrition and successful national implementation thereof. Countries with high stunting rates, including eight countries in sub-Saharan Africa, took part in the country assessments of commitment and capacity in order to measure readiness for scaling up nutrition interventions. Results from the assessment led to several recommendations, namely to utilise and improve existing nutrition programmes before creating new ones; to gain political, multi-sectorial support and to mainstream nutrition; to improve capacity of human resources and provide quality training for those involved to improve implementation of nutrition policies; to improve public knowledge on malnutrition and prevention as well as enhancing surveillance for nutrition programmes; and to ensure data are used effectively to improve these programmes.[56]

The South African National Department of Health 2016-2020 Strategic Plan[57] is aligned with the WHO Commission on Social Determinants of Health's recommendations on achieving equity in health[58] and the South African National Development Plan (NDP 2030)[59] in that achieving health targets requires a well-planned, optimally functional health system. The Strategic Plan supports *'A long and healthy life for all South Africans'* as stated in the Health Negotiated Service Delivery Agreement. The five strategic goals include health and wellness promotion; preventing and reducing diseases; to prepare for implementation of National Health Insurance; improving primary healthcare and school health services; and improving

financial and health facility planning. Once again, nutrition is central in achieving these goals and forms part of the plans for maternal and child health and primary healthcare approaches involving several important sectors. In addition, the plan includes decreasing prevalence of obesity by 10%.[57]

The current situation in South Africa necessitates effective tools to address the burden of malnutrition in all its forms and contribute to public healthcare. Dietary guidelines are one such tool and have been promoted by the Food and Agricultural Organisation (FAO) for over twenty years. In 1995, the FAO/WHO Consultation put together an overarching framework,[4] based on the 1992 World Declaration and Plan of Action for Nutrition.[60] The framework was adopted at the International Conference on Nutrition to be used for developing and implementing tailored guidelines for different countries.[4] It was agreed that South Africa's FBDGs must be easily understood and applicable over an extensive range of circumstantial (biological, social and economic) and nutritional problems (specifically the simultaneous presence of under- and over-nutrition, i.e. 'double burden of disease'). The guidelines should ultimately translate evidence-based research and scientific knowledge into healthier food choices and practices among consumers.[5]

2.2. Brief history of Food-Based Dietary Guidelines

Traditionally, according to the World Declaration and Plan of Action on Nutrition (1992),[60] FBDG were primarily designed to counter famine, starvation and nutrient deficiencies and later, nutrition related communicable diseases and NCDs. For the development of FBDGs for any country, the FAO/WHO Consultation[4] stress the need for population acceptability, comprehensiveness and practicality. FBDGs should be thoroughly researched and created in such a way that they are universally applicable to the country's population and take into consideration as many contributing factors as possible. Important steps towards creating FBDGs includes investigating the links between existing eating patterns, nutritional adequacy and current public health issues to ensure that the guidelines can be integrated into larger, multi-faceted strategies aimed at addressing public health problems.[4,61]

2.2.1. Development of South African Food-Based Dietary Guidelines (SA FBDGs)

Following the FAO/WHO recommendations, the development of the SA FBDGs began in 1997. Various key stakeholders including academics, the Nutrition Society of South Africa (NSSA), the Association for Dietetics in South Africa (ADSA), the Directorate Nutrition of the DoH, the Medical Research Council (MRC), UNICEF, the agricultural sector, and the food industry were consulted. A working group to lead the process was established and realised that in addition to the effects of the nutrition transition, unique characteristics of dietary behaviour and choices in South Africa are driven by socio-economic characteristics and household food insecurity, even when sufficient food is available. The SA FBDGs were formulated with the aim of

providing a pathway to address public health issues through well-designed, scientifically-rooted and culturally appropriate dietary guidelines to help educate and empower the public in making healthy food and lifestyle choices. The guidelines originally aimed to be general and far-reaching, covering children and adults over seven years of age; descriptive rather than prescriptive; culturally acceptable, practical and affordable; take availability, sustainability, and environmental friendliness into consideration; and allow for adjustment for younger children and individuals requiring specific dietary interventions in the future.[4,6,61]

2.2.2. Evidence base for SA FBDGs

The SA FBDGs are evidence-based and take into account the current health issues being faced in South Africa.[5] The guidelines were meant for incorporation into the INP and Primary School Nutrition Programme (PSNP) and as the foundation for nutrition education. Planned systematic revision of the guidelines over time and in correspondence with advances in nutritional science must take place.[61] The first SA FBDGs, designed for those older than seven years of age, were officially published in 2001 and adopted by the Department of Health in 2003. Testing of understanding and implementation aimed to assess if the SA FBDGs could serve as an appropriate nutrition education tool and to provide recommendations for future changes. These messages were tested among women from different populations in the Western Cape and Kwa-Zulu Natal.[6]

2.2.3. Previous studies and testing of the SA FBDGs

In 2001, testing of the preliminary SA FBDGs found that the majority of participants regarded the guidelines as necessary and recognised the importance of their implementation. The main sources for attaining nutrition information among participants were revealed as radio, clinics and schools. Responses were useful for rephrasing certain guidelines in efforts to reduce miscommunication.[6] In 2008 Love et al. researched the application of the SA PFBDGs in Kwa-Zulu Natal and the understanding and implementation of and barriers to the SA FBDGs amongst women.[13] They emphasised the importance of consumer testing as the gateway between availability of nutritional information and implementation of this knowledge affecting positive dietary behaviour and intake.[13] The findings found an understanding of the SA FBDGs across different cultural and socio-economic groups but, also found a lack of practical implementation as a result of barriers in some groups linked mainly to availability and affordability of food. The study also showed differences in interpretation and misconceptions of some SA FBDGs, as well as taste and preparation preferences. This information therefore proves useful in re-formulating some of the messages, and in designing and providing educational materials for community members and healthcare workers.[13] From previous studies, it can thus be deduced that it is possible to have one set of SA FBDGs, provided that context specific, supportive explanations in relevant languages and acknowledging cultural, social and

economic diversity are provided.[6,13] As has been shown with the SA FBDGs, it is important that all FBDGs be tested before adoption and thus testing of the revised Paediatric FBDGs was also considered necessary.[10]

2.2.4. Development and testing of South African Paediatric Food-Based Dietary Guidelines (SA PFBDGs)

The same process used to develop the initial SA FBDGs was followed for the development of SA PFBDGs for the age groups birth to seven years. A preliminary study, testing the understanding and use of the SA PFBDGs among mothers in 2006, concluded that the guidelines were well understood, but some re-wording recommendations to enhance their understanding were suggested as mothers indicated that they did not understand the rationale behind some of the messages. This research has also showed that those who could benefit the most from nutrition education and promotion through using the SA PFBDGs were mothers and children of lower socio-economic status (SES).[62] In 2007, the preliminary SA PFBDGs, focusing on three age groups, i.e. birth to 6 months; > 6 months to <12 months; and from 1-7 years, were published. These however, were not officially adopted by the DoH due to insufficient consumer testing.[6]

In 2011 revision of both the SA FBDGs and SA PFBDGs took place through establishment of working groups under leadership of the DoH. In July 2011, the paediatric working group decided that the guidelines should be divided into four age groupings: 0-6 months, 6-12 months, 1-3 years and 3-5 years, to represent corresponding age-appropriate milestones in feeding practices and congruent with international groupings of health indicators for these age groups. Revised SA PFBDGs were researched, proposed and published in 2013 (Table 2.1), accompanied by the recommendation that the guidelines should be consumer tested.[5]

0-6 months	12-36 months	3-5 years
Give only breast milk, and no other foods or liquids, to your baby for the first six months of life.	Continue to breastfeed to two years and beyond.	Enjoy a variety of foods.
	Gradually increase the amount of food, number of feedings and variety as your child gets older.	Make starchy foods part of most meals.
6-12 months	Give your child meat, chicken, fish or egg every day, or as often as possible.	Lean chicken or lean meat or fish or eggs can be eaten every day.
At six months, start giving your baby small amounts of complementary foods, while continuing to breastfeed to two years and beyond.	Give your child dark-green leafy vegetables and orange coloured vegetables and fruit every day.	Eat plenty of vegetables and fruit every day.
Gradually increase the amount of food, number of feeds and variety as your baby gets older.	Avoid giving tea, coffee and sugary drinks and high-sugar, high-fat salty snacks to your child.	Eat dry beans, split peas, lentils and soya regularly.
Feed slowly and patiently and encourage your baby to eat, but do not force him or her.	Hands should be washed with soap and clean water before preparing or eating food.	Consume milk, maas or yoghurt every day.
From six months of age, give your baby meat, chicken, fish or egg every day, or as often as possible	Encourage your child to be active.	Feed your child regular small meals and healthy snacks.
Give your baby dark-green leafy vegetables and orange coloured vegetables and fruit every day.	Feed your child five small meals during the day.	Use salt and foods high in salt sparingly.
Start spoon-feeding your baby with thick foods, and gradually increase to the consistency of family food.	Make starchy foods part of most meals.	Use fats sparingly. Choose vegetable oils, rather than hard fats.
Hands should be washed with soap and clean water before preparing or eating food.	Give your child milk, maas or yoghurt every day.	Use sugar and food and drinks high in sugar sparingly.
Avoid giving tea, coffee and sugary drinks and high-sugar, high-fat salty snacks to your baby.		Drink lots of clean, safe water and make it your beverage of choice.
		Be active!
		Hands should be washed with soap and clean water before preparing or eating food.

Table 2.1: 2013 Proposed SA PFBDGs

2.3. Brief overview of each of the SA PFBDGs for children aged of 3-5 years

The revised SA PFBDGs for this specific age group are almost identical to the adult SA FBDGs. Three guidelines pertaining to meal frequency, water consumption and personal hygiene have been specifically included for the 3-5 year age group. See Table 2.2 for a comparison between the revised SA PFBDGs and adult SA FBDGs.

	Paediatric SA FBDG: 3-5 years	Adult SA PFBDG: >5
1	Enjoy a variety of foods.	Enjoy a variety of foods.
2	Make starchy foods part of most meals.	Make starchy foods part of most meals.
3	Lean chicken or lean meat or fish or eggs can be eaten every day.	Fish, chicken, lean meat or eggs can be eaten daily.
4	Eat plenty of vegetables and fruit every day.	Eat plenty of vegetables and fruit every day.
5	Eat dry beans, split peas, lentils and soya regularly.	Eat dry beans, split peas, lentils and soya regularly.
6	Consume milk, maas or yoghurt every day.	Have milk, maas or yoghurt every day.
7	Feed your child regular small meals and healthy snacks.	
8	Use salt and foods high in salt sparingly.	Use salt and foods high in salt sparingly.
9	Use fats sparingly. Choose vegetable oils, rather than hard fats.	Use fats sparingly. Choose vegetable oils, rather than hard fats.
10	Use sugar and food and drinks high in sugar sparingly.	Use sugar and food and drinks high in sugar sparingly.
11	Drink lots of clean, safe water and make it your beverage of choice.	Drink lots of clean, safe water.
12	Be active!	Be active!
13	Hands should be washed with soap and clean water before preparing or eating food.	

Table 2.2: South African revised P-FBDG (3-5 years) compared with Adult FBDG (>5 years):

2.3.1. Enjoy a variety of foods

Dietary variety has been described as consuming foods from different food groups as well as using different cooking/preparation methods. A dietary diversity score can be derived from measuring dietary diversity in either an individual or a household.[63] In 2005 Steyn et al. used data from the South African NFCS 1999 to evaluate micronutrient adequacy with dietary diversity as a proxy measure. Results confirmed that the dietary diversity score (DDS: number of food groups consumed) or the food variety score (FVS: number of different food items eaten) can indeed be indicators of the nutritional adequacy of a diet. The study also showed a direct correlation between the nutritional adequacy ratio (NAR; individual intake vs. WHO/FAO recommended average intake for age group), DDS or FVS and child growth indicators, supporting the positive impact of dietary variety.[63]

In South Africa, micronutrient deficiencies remain prevalent despite supplementation, food fortification and dietary diversification interventions in place to address them through the INP. The 'Enjoy a variety of foods' guideline aims to increase the intake of different foods through the selection of a variety of foods, and considering all other guidelines, rather than only eating a limited selection of foods and therefore ensuring the intake of different nutrients in order to meet dietary requirements, in this case specifically for young children. The term 'enjoy' also implies that eating should be a time to relax and be together with others. Government collaboration with communities, schools and NGOs across South Africa to establish

vegetable gardens to improve food security can support this guideline by aiming to increase the availability of dietary variety.[64] As described in a study of South African dietary diversity, this is not an easy guideline to follow, especially for individuals with limited resources, reinforcing the need for collaboration between health, social, financial and agricultural sectors to work towards improving access, availability and affordability of dietary variety.[65] This guideline is the same for adults and children between the ages of 3-5 years and has been part of the FBDG since 2001[61] and has never been changed, indicating its continued importance as a core element of a nutritionally adequate diet for all.[66]

2.3.2. Make starchy foods part of most meals

Carbohydrates in the form of natural sugars (including mono- and di-saccharides and polyols) and oligosaccharides are found in many plant-based foods, including vegetables, fruit and sugar crops. Milk products also provide small amounts of carbohydrates. Carbohydrates are an important food group providing energy and through positive physiological effects, such as contributing to fibre and micronutrient intake; regulating blood glucose and insulin levels; stimulating growth of beneficial bacteria in the gut; lowering triglyceride and low density lipoprotein cholesterol levels; and replacing animal protein and unhealthy fats, offer protection against the development of NCDs.[67] It is, however, important to pay attention to the types and amounts of carbohydrates consumed so as to limit refined carbohydrates such as processed cereals and flours lacking fibre and nutrients as well as added sugar, i.e. table sugar. Most of the energy, soluble and insoluble fibre, prebiotics and micronutrients in an individual's diet should be provided by minimally processed carbohydrates including whole grains and cereals, legumes and root vegetables. There are concerns that low carbohydrate diets may be lacking in important micronutrients, namely vitamin A, vitamin B_1 and B_6, and folate and minerals such as magnesium, calcium and potassium. Furthermore, such diets may contribute to the burden of NCDs and have been described as unsustainable.[68,69] In South Africa, starchy staple foods (e.g. maize meal and white and brown bread flour) are part of the mandatory food fortification programme that requires them to be fortified with vitamin A, iron, zinc, folic acid, vitamins B_1, B_2, B_3 and B_6.[70] Availability and affordability as well as their role in satiety make starchy foods important in the diet, especially in low- and middle-income countries with high levels of poverty and low food security.[61,67]

In South Africa, carbohydrate-rich/starchy foods are the most commonly consumed food group. However, consumption trends have shown a general increase in sugar intake but a decrease in total carbohydrate and dietary fibre intake alongside the nutrition transition that is taking place.[39,67,71] It is therefore essential to promote the consumption of minimally-refined and -processed starchy food items in combination with other foods to support nutritional adequacy. Reducing reliance on increasingly available and affordable refined carbohydrates, implementing more specific marketing and labelling regulations to decrease

misleading marketing of carbohydrate-rich foods as well as educating the public on classification of carbohydrates and their health benefits is a significant challenge.[66,67]

It has been shown sugar-sweetened beverages (SSBs) can be linked to weight gain, obesity and increased risk for NCDs.[72] In light of South Africa's increased consumption of refined carbohydrates, added sugars and SSBs, further efforts to reduce sugar intake have included the introduction of tax on SSBs. Although research shows mixed results from taxing SSBs, increases in bottled water sales versus lower sales of SSBs have been shown in Mexico and California in the United States of America.[73–75]

2.3.3. Eat plenty of vegetables and fruit every day

According to data from the 1999 NFCS, South Africa had suboptimal dietary diversity scores and intake of fruit and vegetables among children <5 years of age was low.[76] Regional studies show that low fruit and vegetable intake is associated with poor micronutrient status in children, specifically vitamins A and C and folate. Results from national and regional studies indicate that intake of fruit and vegetables for South African children between the ages of 2-5 years ranges from 99g-206.2/day,[76,77] compared to theoretical recommendations of at least 330g/day for children (0-4 years) and 480g/day for older children (5-14 years),[78] with evidence of gradual decreases over time.[79] Research amongst adults also indicated that 80% of adults do not consume adequate amounts of fruit and vegetables.[80] These findings show that intakes are not sufficient to meet the dietary needs of individuals or offer protective effects, such as the reduction in NCDs that has been documented with increased fruit and vegetable intake.[81]

Food insecurity and low variety in South African diets accentuate micronutrient deficiencies that can be counteracted by improving the availability and consumption of fruit and vegetables. The guideline 'Eat plenty of vegetables and fruit every day' is designed to be concise and easy to remember and emphasises the importance of fruit and vegetables as part of, and is intended to increase the overall, daily consumption and variety of vegetables and fruit. The technical support paper for this guideline, provides in-depth information regarding serving sizes as well as how, why and what variety means. Emphasis is placed on including cruciferous, dark green leafy and orange/yellow vegetables and including fresh fruit, also including yellow/orange fruit daily. The guidance highlights that any canned, dried, cooked or fruits in juice form are not the best options, while vegetables can be either raw or cooked according to type. In addition, this guideline outlines the importance of parents modelling behaviour for children under 5 years of age and encouraging them to eat different vegetables and fruit, and also provides practical, economical advice to ensure that children are exposed to a wide variety at a young age.[81]

Major barriers in implementing the guideline, following previous consumer testing were taste preference among children and men, seasonal availability and the cost of vegetables and fruit. Team-work by multiple stakeholders in government, private and non-profit organisations through various educational efforts, communication strategies and media channels have been recognised as the best way to educate the public and increase accessibility and consumption of these foods.[81]

2.3.4. Lean chicken, lean meats, fish and eggs can be eaten daily

Animal-source foods provide essential fats and micronutrients such as iron and zinc, vitamin A and B vitamins together with good quality protein in a more nutrient dense, bio-available form than plants. Animal source foods are particularly useful in vulnerable, nutrient deficient or ill groups of people, as smaller amounts of these foods will provide crucial nutrients, namely iron, zinc, B_1, B_2, B_6, B_{12} and vitamin A to curb anaemia and improve physical and mental development.[82,83] Animal source foods are appropriate for providing essential micronutrients and fats for those who are not meeting requirements, especially growing children, however, negative effects such as unhealthy weight gain and serum lipid profiles can develop from consuming large amounts of saturated fats and cholesterol and when deficiencies are absent. The carbon footprint of cultivating animal source foods also needs consideration as the growing world population requires nutrient-dense foods. This requires natural resources such as land and water to be allocated and shared and greenhouse gas contributions of certain livestock production to be minimised to sustain both the human population and the environment.[84] The livestock sector, specifically, lacks policies and support for its rapid growth. The economic impact of rapidly increased agricultural productivity in low- and middle-income countries, on food prices, poverty, livelihoods, food security and opportunities to grow a country's entire economy has been discussed in the FAO's State fo Food and Agriculture report (2009) and must be taken into account and be addressed when promoting dietary intake of animal source foods.[82] This further emphasises the diversity of the factors to be considered when developing and implementing FBDGs to encourage intake of an adequate but prudent diet that takes care of deficiencies but also does not increase the burden of chronic NCDs and preserves the environment. Vegetarian diets can be adequate if carefully planned, as there are potential risks of low intakes of protein, iron, vitamin B_{12}, omega-3 essential fatty acids and calcium. [85]

The technical support paper for this guideline stipulates the importance of the types of animal protein and portion sizes for these foods.[85] In South Africa 'lean' refers to meats containing <10% fat and those with <5% are classified as 'extra lean'. Chicken, red meat, pork and lamb are all considered to be good sources of protein, some minerals and certain vitamins. Pork and chicken can be adjusted to be more lean by cutting away the visible fat (pork) and removing the skin (chicken) before cooking and using low fat cooking methods, rather than the preferred deep-fried chicken that is preferred in South Africa. Lean red meat or

lamb can also be included as part of a healthy balanced diet. Fat-trimmed mutton and lamb contains <10% fat, similar to chicken, and is known to contain conjugated linoleic acids which can be protective against NCDs.[84,86] The nutrient profiles of fish and eggs show that they are also important in a balanced diet. Essential fatty acids important for brain development, growth and the functioning of the immune system, and calcium can be found in fish (in soft bones) while eggs also provide excellent quality protein and nutrients. Both are considered particularly important for young children and pregnant women and should be consumed regularly. [85,87,88] The nutrient density of organ meat varies but is generally considered to a concentrated source of vitamins A, B and D as well as iron and zinc.[89] Processed meats are not recommended as they are considered to be high in sodium, associated with hypertension and increased risk for cardiovascular disease; [90] and contain nitrites/nitrates which have and are still being investigated as potentially carcinogenic and atherosclerotic agents.[84,91,92] Research shows that in recent years there has been an increase in the consumption trend for chicken, red meat and eggs in South Africa parallel with the nutrition transition and a decrease in legume, wholegrain and vegetable intake which, together contributes to the country's complex public health problems.[38] As with similar guidelines in other countries, the supporting information for this guideline in South Africa highlights the type, cut and fat content of the meat eaten as well as healthy preparation techniques and portion control.[85]

2.3.5. Eat dry beans, split peas, lentils and soya regularly

The initial 'Eat legumes regularly' SA FBDG was rewritten based on consumer testing of the message. Love et al. reported consumers' lack of understanding of the guideline and consumer suggestions resulted in changing the wording to 'Eat dry beans, split peas, lentils and soya regularly' in order to provide greater clarity regarding the foods included.[93,94]

Ensuring sufficient energy and nutrients, while simultaneously preventing the increase in NCDs, presents a dietary challenge. Dry beans, split peas, lentils and soya provide a unique nutrient profile with the potential to contribute to a healthier diet and decrease different forms of malnutrition, improving overall health. Research shows that they provide essential nutrients (including B vitamins, zinc, folate and iron) that they could have a beneficial impact on diet-related NCDs, such as type 2 diabetes mellitus, cardiovascular disease or cancer.[95,96] As a source of protein, their low sodium, low fat, high fibre profiles and affordability compared with meat, make them suitable foods to include in a healthy diet especially in addressing the increasing burden of NCDs in South Africa. A commonly consumed staple known as 'samp and beans' (a combination of beans and maize), provides affordable, good quality protein in the absence of meat. Being naturally cholesterol free and having a favourable fatty acid profile (higher levels of unsaturated fatty acids), makes legumes important to include in the diet as an alternative to red meats. [97,98] In addition, these

foods also provide complex carbohydrates and soluble and insoluble fibre, and have a role to play in improving blood glucose control.[94]

Research also shows that dry beans, split peas, lentils and soya provide unique non-nutritive components that offer various positive effects. The presence of specific nutritive (e.g. carbohydrates, fibre and fats) and non-nutritive (e.g. isoflavones and saponins) components have demonstrated positive cancer-fighting, antioxidant, cholesterol and glucose-lowering effects.[95,97] Legumes can also have favourable effects on weight loss and obesity prevention through increasing the feeling of satiety.[99,100] Although there are no conclusive studies confirming the cancer-protection of these foods, it is considered that their fibre content offers protection against large intestine cancers, while possibly similar effects regarding other cancers are being researched.[101] The possible negative effects of these food items involve interference with the absorption of some essential micronutrients (e.g. calcium, iron and zinc) if consumed in large amounts and potentially aiding cancer progression through oestrogen-mimicking properties. Cooking them until soft has however been shown to reduce negative side effects.[94]

Globally, legume consumption is generally lower than has been recommended by the National Heart, Lung and Blood Institute as part of the Dietary Approach to Stop Hypertension (50g/day)[102] but has remained relatively unchanged in South Africa at ~34-37g p/day over the last 10 years.[103,104] South African studies have reported that legumes are more commonly consumed in rural, low socio-economic areas predominantly as a result of their affordability. Barriers to consumption include flatulence, allergies and the long preparation time required as well as unfamiliarity in using them and taste preferences among various cultural and socio-economic groups.[6,13,94]

Since establishing the SA FBDGs, helpful guides and recipe ideas to incorporate dry beans, split peas, soya and lentils into the diet have been published and promoted. [94,105,106] As these foods are affordable and can easily be stored for longer time periods of time, they are ideal foods to promote in South Africa to improve nutritional status and micronutrient profiles. This guideline speaks to consumers and nutrition and health sector role players, but also to marketing and agricultural departments to work together towards promoting these food items and empowering individuals to increase their consumption.[94]

2.3.6. Consume milk, maas or yoghurt every day

The initial SA FBDGs, established in 2001, were amended to include this dairy-specific recommendation in 2012. Previously considered as part of the 'Chicken, fish, meat or eggs can be eaten daily' guideline and described as unnecessary, this guideline has since been allocated its own place in the SA FBDGs due to South Africa's persistent chronic disease profile, low calcium and low potassium intake levels. [107]

Dietary contributions of milk products have been examined, highlighting low sodium, high potassium, high calcium content and good quality protein as positive aspects of their nutritional profile. The guideline refers specifically only to milk (including powdered milk), maas (milk that has been fermented) or yoghurt and the technical support paper stipulates that cheese is not included and that unsweetened, low fat products may be best for those affected by elevated blood pressure and/or obesity.[107] It has been reported that milk and fermented milk products have the potential to reduce blood pressure and inflammation in hypertensive or obese individuals through providing more potassium than sodium, calcium and bioactive peptides.[108–110] Important probiotics that help maintain gut health are also present in milk.[108] Various fatty acids found in milk could potentially be protective against development of NCDs and cancers.[110] It has been suggested that calcium in milk can act in similar ways to medications in reducing cholesterol absorption.[109,110] More research is needed to substantiate claims of unhealthy or harmful effects of saturated and trans-fatty acids from ruminant milk. Alongside possibly beneficial effects on chronic diseases, positive effects of milk on bone health and growth in children have been investigated. In LMICs, reported decreases in morbidity among chronically malnourished (i.e. stunted) children support the link between milk consumption and bone development. Although the roles of calcium and vitamin D in bone health have been recognised, there is a lack of strong supportive evidence for the protective effects of milk.[107]

Lactose intolerance as one of the biggest concerns, especially regarding the prevalence among African populations, was one of the factors that contributed to excluding a dairy guideline in the first set of SA FBDGs. It is now known that consuming milk products with other food or meals as well as choosing fermented dairy products, for example maas or cheeses, can decrease symptoms among individuals who are lactose intolerant.[107,111]

In South Africa intake of milk and dairy products is considered to be low (less than the recommended 2-3 servings/500-750ml minimum per day),[112,113] thus increasing the risk for deficiencies in calcium and vitamin D among other micronutrients. Barriers to milk and dairy product consumption have been identified as their cost, religious and cultural beliefs. Other factors influencing milk consumption have included limited knowledge as to the health benefits of milk and already discussed negative effects and intolerance related to milk and dairy products.[61,107] Education about milk and dairy products is therefore warranted and it is clear that the promotion of milk consumption is a priority in South Africa, given the increasing incidence of diet-related NCDs together with malnutrition, especially among children.[107]

2.3.7. Feed your child small regular meals and healthy snacks

The WHO/UNICEF best practice recommendation is that *'infants should be exclusively breastfed for the first six months of life to achieve optimal growth, development and health.'* Following on, complementary feeding, should provide the child with sufficient energy and nutrients, fostering optimal growth and development up to two years of age.[15] Research has shown that malnutrition occurring during the first two years of life is difficult to reverse. Complementary feeding has been identified as a priority focus area by the WHO.[15] It is important to ensure both the correct timing of feeding and the intake of nutrient dense foods, in order to meet the child's requirements and to potentially reduce the risk of complications such as stunting and overweight or obesity and NCDs in adolescence and adulthood.[114]

South African surveys have shown that levels of stunting, indicative of growth faltering, increases after 12 months of age.[11,42] The increasing prevalence of overweight and obesity in this age group (and in some cases in stunted children) also highlights the importance of nutritional practices. WHO guidelines on complementary feeding support exclusive breastfeeding for the first six months of an infant's life, followed by the gradual introduction of nutrient dense foods together with continued breastfeeding up to two years or longer.[15] Complementary feeding should comprise of foods that are high in nutrients, particularly those that are shown to be lacking (e.g. zinc, iron and vitamin A) and should be fed frequently as infants and young children are not able to consume large portions at one time. Poverty, availability and the cost of foods are major factors that influence complementary feeding practices in rural areas in South Africa. The low nutritional value of maize meal porridge (the most common first food for older infants) is sometimes enriched at the household level by the addition of sugar, peanut butter, milk powders, eggs or oil to meet energy and protein requirements. However, consistency is often adjusted by additional water and it remains inadequate to meet specific micronutrient requirements of young growing children.[114] Importantly, maize also contains phytates that can reduce zinc and iron uptake.[115] Research has shown that dairy and animal products as well fruit and vegetables that are known sources of vitamin A were only consumed by <30% of infants in the province of Kwa-Zulu Natal.[116] The combination of low nutritional value foods and the early introduction (<six months) of complementary foods, reported by >50% of mothers/caregivers in peri-urban and rural areas across the country, have been linked to a lack of education, belief that breast milk is inadequate or not produced in adequate amounts and cultural beliefs that additional food is necessary for healthy babies.[117–119] In addition, mothers who are young with a low socio-economic status, who smoked and who received inadequate information or support from healthcare workers have been identified as influential in early complementary food introduction in developed countries.[114]

The current complementary feeding practices in South Africa have contributed to low levels of zinc, iron, calcium and other vitamins, as reported by national surveys, and need to be addressed directly.[42–44]

WHO/UNICEF global recommendations for infants between 6-24 months highlight the importance of consuming a diverse diet consisting of locally available animal- and plant-based foods for provision of adequate protein, fat and vitamin A (orange fruits and vegetables as well as dark-green leafy vegetables), specifically, along with other essential micronutrients for optimal growth support. Appropriate supplementation, enriched and fortified foods are also recommended in order to address nutrient deficiencies of public health significance.[114,120] The WHO Comprehensive Implementation Plan on Maternal, Infant and Young Child Nutrition emphasises the value of continued efforts to maintain positive nutritional status beyond the first 1000 days, pointing out that micronutrient deficiencies (e.g. Vitamin A and iron) extend into children in the 3-5 year age group and still require dietary and supplementation interventions.[34]

Nutrition related public health challenges such as stunting and overweight warrant a closer look at the multi-dimensional factors that can affect a young child's relationship with foods and eating. Children between the ages of 2-5 years are in a time of transition to self-sufficiency and during which eating becomes associated with a child's family, home and social environment, rather than being driven purely by hunger. This is an important phase in child development to shape eating behaviours and potentially prevent development unhealthy habits and development of NCDs.[121] Parental eating behaviours demonstrate behaviours (i.e. modelling) that young children can start to mimic as they learn to eat by themselves, and this also affects what foods are available in the home. Similarly young children can adopt eating behaviours and food preferences from watching peers/siblings/other family members.[122,123] The structure of mealtimes and portion sizes are important in this age group. Research has shown that children are able to regulate their energy intake according to their needs but that this ability can be altered when a child is presented with larger/adult food portion sizes, resulting in children eating more food than they require.[124] This highlights the importance of providing age appropriate portions or allowing children to determine their own portion sizes, from a selection of healthy food items, in relation to and to maintain the sensitivity of their physiological hunger and satiety cues.[125] The SA PFBDG 'Feed your child small regular meals and healthy snacks' is therefore an important guideline addressing the parent/caregiver and environmental factors that have an impact on young child nutritional status. Education of parents/caregivers on healthy eating and on how their eating behaviours and implementation of the guideline can aid the development of a child's ability to regulate their food intake can help to successfully implement the guideline.[126,127]

2.3.8. Use salt and foods high in salt sparingly

The prevalence of hypertension in South Africa is on the rise.[11] The WHO 2014 South African country profile report showed 19% mortality due to cardiovascular diseases in South Africa.[128] According to the 2016 SADHS, over 40% of men and women over 15 years of age are hypertensive, and the Western Cape was

identified as one of the provinces with the highest prevalence.[12] High levels of sodium consumption are also known also to increase the risk of renal complications, bone disease, stomach cancer and asthma.[129,130] Research shows that hypertension is preventable and manageable through diet and lifestyle modifications.[131,132]

Consumption of salt from a young age alters taste perception and forms preferences, potentially contributing to hypertension over time. The WHO supports that salt consumption should be controlled in both adults and children.[90] He and MacGregor pointed out that many high-salt foods that young children are exposed to (e.g. salty snack foods) may alter taste perceptions and increase intakes of saltier foods, thereby predisposing children to hypertension in later years.[133] A systematic review on blood pressure in childhood through to adulthood also found that childhood blood pressure was strongly associated with adult blood pressure.[134] These findings support early childhood preventative interventions as effective for reducing adult hypertension.

Globally, consumption of salt remains above the maximum 5g per person per day recommendation at over 6g in those over five years of age and up to 12g per day among Asian populations.[90,135] Approximately 4-11g a day is the general estimated salt intake of South Africans.[136,137] Salt from bread, hard margarine, ready to mix soups/sauces and atchar (a spicy condiment usually containing pickled fruits or vegetables in oil or brine with spices) were identified as the most common sources of sodium across the diverse South African population, respectively providing 5-35%, 13%, 17% and 5% of overall sodium intake. An estimated 40% of total sodium intake was from discretionary salt (added during and after food preparation).[136,138] As an outcome of the 2011 Summit on NCDs in South Africa, a goal to work towards reducing salt intake to less than 5g per person per day by 2020 was set.[136,139] The South African Hypertension Guidelines currently stipulate an upper limit of 2400mg for sodium (<6g of salt per day) intake, slightly higher than the WHO limit of 2000mg of sodium (<5g of salt per day).[139] Salt reduction has been identified and accepted as one of the top priority global interventions in the fight against NCDs and achievement of global developmental targets by the Lancet Non-Communicable Disease Action Group and the Non-Communicable Disease Alliance, aligned with the WHO Global Action Plan for the prevention and control of NCD.[140] Therefore, empowering individuals through advocacy for healthy eating and education on the effect of salt on individual health and its costs is of great importance. As cardiovascular disease has been documented as one of the leading causes of mortality worldwide,[141] reduction in salt consumption provides a way to tackle the issue that can be implemented by each and every individual as well as by the food production industry and governmental sectors with an impact on salt consumption.[136]

South African legislation has been set in place to, over the period from 2013-2019, steadily decrease salt content in commonly consumed foods and to result in health cost savings.[142] The previous version of the SA

FBDG was revised from: 'use salt sparingly', which did not clearly include processed foods, to the newer version: 'use salt and foods high in salt sparingly'.[136] Researchers have explored sources of sodium and the level by which the sodium content of these foods can be reduced to minimum levels without significantly affecting taste.[143,144] There is speculation that higher salt consumption can urge people to want to eat more salty foods.[145] As a major sodium-contributing food item in South Africa, bread has been researched.[143,144] It has been reported that reducing the amount of sodium in bread is less noticeable, generally accepted by individuals and has the power to significantly reduce blood pressure.[144,146,147] To assist in reducing salt consumption even further, it is vital to empower consumers to make low sodium choices every day. Consumer education is the next big step in achieving healthier dietary decisions. Misunderstandings and perceived complexity of nutritional content labels are challenges to be addressed. By teaching the public how to understand and compare labels and use of clearly visible, well-known health logos (e.g. Heart Foundation logo), it is anticipated that dietary sodium intake will decrease. This food-based dietary guideline forms part of the basis for health promotion related to cardiovascular disease form an early age and to create a supportive environment advocating reduced salt consumption.[136]

2.3.9. Use fats sparingly. Choose vegetable oils, rather than hard fats

Fat intake in South Africa is achieved mainly through several commonly consumed food items, including milk and dairy products, non-dairy creamers, margarine, chicken, eggs, meats, peanut butter and salty snacks.[148] Fast food consumption in South Africa has been shown to be common (roughly once a week or more often) among all age groups and economic groups,[149] but daily consumption was recorded more often in low socio-economic groups.[148] Fried foods and processed potato chips are high fat foods commonly consumed by South African school children, a cause for concern regarding marketing of foods and availability thereof to children outside of the home. Data on fatty food consumption of children between the ages of 3-5 years is rare, but available data has shown increased consumption of energy-dense, carbohydrate foods, often fried in oils, among young children.[148,150]

New research and data since 2001 made the revision of this SA FBDG necessary. Research showing differences in dietary energy intake from fat in rural (20%) and urban (30%) populations[38] showed the importance of taking various eating patterns into account when proposing national dietary guidelines as some individuals barely meet the minimum requirements for fat intake (20-35%).[151,152] In addition, it is well established that certain fatty acids are essential (i.e. must be acquired through the diet) and fulfil important physiological functions, and the experts agreed that the guideline should not only provide guidance on the amount of fats consumed, but also on the types of fats.[148] Food-based dietary guidelines should provide advice as to how consumers can an ensure adequate intake of the essential fatty acids (omega-3 and -6)

that provide beneficial cardiac and neurological health effects; influence growth and development and; provide protection against degenerative diseases.[87,153]

Previous research has been unable to form one generalised conclusion or consensus regarding percentage of total fat intake in the diet and weight gain (and subsequent risk of NCDs). Investigating individual fatty acids more closely, has been the focus of more recent research. Saturated fatty acids (solids at room temperature, i.e. 'hard fats') are mainly derived from animal sources and some plant oils and have been associated with negative effects on blood lipids and increased risk of heart disease in the past, but strong supportive evidence is lacking.[154] Saturated fatty acids have also been positively linked to increased levels of high density lipoproteins and lower triglyceride levels, albeit it together with negative increases in low density lipoprotein levels.[155] Omega-3 fatty acids have been considered especially important for foetal development and for infants and young children up to the age of two years.[156] Polyunsaturated fatty acids are known for their important functions in child development (e.g. in the brain and eyes) and for decreasing risk of coronary heart disease. Trans-fat consumption has been linked to elevated risk for coronary heart disease.[157,158] Trans-fat content in processed foods seems to be higher than is naturally present in ruminant products..[159,160] However some researchers state the importance of lowering all trans-fatty acid intake and consider the effects of both types to be harmfu.l[161] Replacing trans-fats with unsaturated fats in the cis configuration has been recommended in food processing to reduce the trans-fatty acid content and lower risk of coronary heart disease.[159] Food labels should clearly state trans-fat content and can only be declared 'trans-fat free' if content is <1g per 100g according to South African regulations.[148,162]

It is recommended that as saturated fat intake is decreased, it should be replaced with mono- and poly-unsaturated fats (ensuring adequate omega-3 and -6) in order to positively affect cholesterol levels and effectively lower the risk of heart disease. Fat should still contribute up to 30% of energy intake for children over two years of age and 30-35% for those below two years of age.[152] It is envisaged that the SA FBDG 'Use fats sparingly. Choose vegetable oils, rather than hard fats' will communicate the importance of both quantity and quality as clearly as possible. Recommendations for following this guideline include choosing low fat dairy products, eating oily fish, using vegetable oils (e.g. canola or sunflower) and checking food labels for total fat and trans-fat content.[148]

2.3.10. Use sugar and foods and drinks high in sugar sparingly

Research on the effects of sugar on health has suggested some negative effects, possibly playing fundamental roles in the development of NCDs. Research in the field has strengthened these suggestions and found that increased consumption of sugar, specifically SSBs, can contribute to increased total energy intake and influence significant weight gain, increase risk of type II diabetes mellitus and potentially also

heart diseases.[163–165] Sugar has also been strongly associated with decaying of teeth as well as reduced micronutrient intake; especially in young children.[166]

NCDs, malnutrition and micronutrient deficiencies are well-established problems in South Africa.[11] As a large percentage of the South African population is either rural or becoming more urbanised and of low to middle socio-economic status, some of the most available and affordable foods contain added sugars, associated with providing high energy and good taste.[167] Table sugar, juice concentrate (to mix with water before drinking), jam, biscuits, carbonated and sweetened cool drinks (SSBs), sweets and breakfast cereals are foods that are often eaten by 1-9 year old children in South Africa, providing up to 14% of their total energy intake as sugar.[166,168] Intake of high sugar-containing foods and especially sweetened drinks has been reported to increase in adolescents (between 10-13 years of age), increasing up to values of 20% of total energy intake, double the recommended 10%.[166,169,170] Sugar as a percentage of total energy in adults has also been estimated to be above the recommendation.[166]

It has been reported that frequent consumption of sugar-rich foods as well as the time period that sugar is retained in the mouth (e.g. hard-boiled sweets) are major factors in occurrence of dental caries and tooth decay if unaddressed.[166] Avoiding sugar-sweetened foods, improving oral hygiene, fluoride use, and dental care and not letting young children fall asleep with drinking bottles are preventative measures that can be taken, especially in South Africa where dental caries are problematic and often untreated.[166,171–173] Elevated consumption of sugar and sugar-containing foods potentially decreases micronutrient intake, although convincing evidence is lacking.[174,175] Food price evaluation in South Africa has shown that sugar-rich foods, containing no micronutrients, are cheaper than nutrient-dense foods, i.e. fruits and vegetables. Thus, the displacement of energy from micronutrient-rich foods by more affordable, sugar-sweetened foods, especially in lower socio-economic environments, seems to affect malnutrition.[176] Convincing research on sugar and unhealthy weight gain has specifically pointed out that refined sugar-sweetened beverages, with low satiety levels but preferred taste, result in greater energy intake. Lowering sugar intake has been linked to weight loss[163] and reduction in sugar consumption is recommended in efforts to prevent onset of chronic diseases of the lifestyle including diabetes and heart disease as well as preventing development of certain cancers.[164,165] Epidemiological study reports have described an increased risk of metabolic syndrome (i.e. the combined presence of overweight, insulin resistance and dyslipidaemia) leading to type 2 diabetes[163–165] as well as increased risk for cardiovascular disease in relation to high consumption of sugar-sweetened beverages, i.e. 1-2 portions per day.[166]

The WHO proposes that sugar intake should be controlled, limiting its intake to approved amounts for adults and children.[170] Ten percent or less of total energy intake has been suggested as safe, further decreasing consumption to <6% for those already presenting risk factors for NCDs, or those who have a lack

of access to fluoridated water (known to counteract acidity related to tooth decay). [170,177] It is clear that SSBs, significantly contributing to refined sugar intake, should thus be consumed less often and limiting intake of fruit juice, only marginally lower in sugar content, is also appropriate.[166,178] Consumption of whole fruit, vegetables and minimally processed foods should be encouraged. In light of the available research on sugar and health, the SA PFBDG pertaining to sugar is a step in the right direction, but it is clear that collaboration and multi-pronged approaches (e.g. consumer education together with SSB tax implementation) are necessary to help decrease sugar consumption and improve health of South Africans.[166]

2.3.11. Drink lots of clean, safe water and make it your beverage of choice

Water is essential to life and bodily water is meticulously controlled by various physiological mechanisms, meaning each body regulates thirst, fluid and excretion needs differently.[179] However, infants, children and the elderly are inherently at higher risk of dehydration because of a greater chance of failure to restore daily losses.[180,181] Recommendations for water intake have varied according to specific countries and considering intake history regarding a population's general food and beverage consumption, as there are various ways to measure hydration levels and specific water intake levels for optimal health cannot be explicitly given.[179] WHO has provided a general daily recommendation of 2.2L and 2.9L for women and men, respectively.[182] If children are outdoors and active in warmer weather conditions, they experience similar losses of water and electrolytes as adults, making it imperative to ensure their stores are replenished to avoid dehydration and electrolyte imbalances.[183]

The evidence for this guideline suggests a personalised water consumption strategy is the best way to ensure adequate water intake for active individuals, including children, as thirst may not always prevent dehydration but consuming set pre-determined amounts of water could lead to over-hydration and insufficient sodium levels known as hyponatraemia, which could be fatal.[184,185] Since recommendations and estimated dietary reference intakes (DRIs) for water have previously relied on consumption patterns of healthy individuals,[179] this approach is also applied to estimating water requirements for young children. In 2003, the recommended daily amounts for children between the ages of 1-3 years and 4-8 years, respectively, were 1.3L and 1.7L per day, including water from food and beverages.[186] More recently, Warren et al.[187] outlined the difficulties punctuating the task of fluid intake assessment in young children (2-4 years), as they lack the necessary skills to recall dietary intake and portion sizes themselves. Until they reach at least 8-10 years of age, parents are better in control of estimating a young child's dietary intake and likely to be significantly biased due to the child not always being in the parents care at this age.[187,188]

According to the South Africa NFCS 1999, involving children between the ages of 1-9 years, juices mixed at home (juice concentrate/cordial mixed with water), tea and whole milk were commonly consumed beverages contributing to water consumption.[43,189] Roughly 16% of added sugar was attributed to cool drink (SSB) consumption.[43,190] Global increases in consumption of energy-containing beverages and their impact on health, weight gain and NCDs such as diabetes have been observed.[164,179] In a review of South African studies that described the possible role of sugar in NCDs, dental and micronutrient health, authors found that SSB consumption among children is increasing across the country.[168] Similarly, an article on changing food consumption patterns over 10 years in South Africa, carbonated beverage (including SSB and artificially sweetened beverages) consumption reportedly increased by almost 70%.[191] Implementation of the 'Drink lots of clean, safe water and make it your beverage of choice' SA PFBDG aims to encourage children to drink water in the face of extensive aggressive marketing by SSB providers. The possibility of pairing SSB providers' extended reach with micronutrient fortification and healthier beverages in the future has been discussed elsewhere.[192,193]

South African water consumption and availability are suboptimal, and it has been estimated that over five million people experience lack of water security. Water quality is one of the biggest concerns regarding healthy water intake guidelines. Industrialisation and poorly functioning sewage treatment plants are major contributors to South Africa's gradually declining water quality.[194] More research is necessary to highlight problems and solutions to improve water quality and access. In terms of fluoride and the known health consequences of over- and under-consumption,[195,196] South Africa must provide treated water accordingly in identified high and low fluoride areas to prevent dental and bone related issues. This guideline has an important role in working towards SDGs and it is imperative that access to clean, safe water is made viable and provided to all.[184]

2.3.12. Be active!

The current nutrition transition in South Africa, leaving the population under- or over-nourished along with deficiencies and/or chronic lifestyle diseases, can be counteracted by promotion of healthy living and eating habits.[197] Physical activity and even 2-3% reductions in bodyweight have been associated with numerous physiological benefits for those presenting with risk factors for NCDs.[198,199] Physical activity has been shown to boost immunity and strength and maintain healthy weight and has been described as providing effects similar to medical treatment for NCDs and, even more importantly, in the overall prevention of these diseases.[200–203]

Diet and lifestyle play central roles in either development or prevention of NCDs. As these diseases affect a large part of the population in South Africa,[204] it is important that children and adolescents learn healthy

habits early on. Healthy eating habits and an active lifestyle have shown a capability of reducing the risk of diabetes (by 58%), more strongly than diabetic medication (at 31%).[203] It has been reported that regular exercise positively influences insulin sensitivity, dyslipidaemia, blood pressure and weight management, showcasing its importance in management or prevention of type 2 diabetes and cardiovascular disease. Generally, 150-250 minutes (30-45 minutes per day) of physical activity throughout the week for adults has been recommended to achieve maintain body weight.[202,205] Aerobic exercise has been reported to lower blood pressure, lasting up to 24 hours after exercise has been completed.[206] Inclusion of resistance exercise could potentially result in a higher resting metabolic rate and reduction of body fat.[202]

As physical activity is vital for growth and development there are recommendations that healthy toddlers (1-3 years) and pre-schoolers (3-5 years) have at least 180 minutes of physical activity in a day and that screen time should be restricted to 1-2 hours per day.[200,207,208] A systematic review concluded that physical activity among 2-4 year old children has positive effects on adiposity; cardio-metabolic health; psychosocial and motor skill competencies, but also that there is a lack of specific recommendations as to how much or what type of exercise is optimal at this age.[209] Downing et al. concluded that for children between 0-5 years, interventions that last longer than 6 months and are implemented by the parents, in the community or at preschools can significantly reduce sedentary behavior and time spent in front of screens and that early childhood may be an optimal window for reducing sedentary behavior.[210] A randomized controlled trial aimed at increasing physical activity in 4-year-olds concluded that teachers trained to incorporate and encourage activity often during the day, inside and outside the classroom, improved levels of physical activity.[211] There is a lack of physical activity data in South Africa for the 3-5 year age group. One study found that activity levels of rural South African children (5-6 years) were lower than international levels.[212] However, given that 13% of South African children under 5 years of age are overweight,[12] interventions in this age group can be important to reduce sedentary behaviour and improve child health and development.[209]

The double-sided malnutrition conundrum in South Africa has been attributed partly to suboptimal living conditions and low income associated with the urbanising population.[213] Potential outcomes of over-nutrition and decreased physical activity include suboptimal gross motor development and negative effects on academic progress.[214] The percentage of South African adolescents meeting physical activity recommendations (60 minutes per day) has been recorded as 50% or less among males and females.[215] Adolescence and puberty have been identified as stages during which activity levels drop (particularly among girls) and subsequent weight gain leads to decreased ability or fitness leading to increased likelihood of not participating in physical activities even more.[200,214,216,217] It has been reported that almost a third of adolescents could not say why they were inactive whereas others reported disinterest, sickness, safety and lack of equipment as perceived challenges.[218] Common barriers to achieving recommended

physical activity levels have included urbanisation and compromised outdoor safety (due to crime incidence and extended working hours of adults) among younger members of the population.[218]

Difficulties in meeting recommendations among South African adults have been reported as their own suboptimal health status and other commitments, inadequate access to equipment or facilities and not being reached by health promoting activities that are only initiated in certain areas of their community. This guideline emphasises the importance and potential impact of physical activity on health at all ages and endorses the development of a national physical activity policy to catalyse education and empowerment of all individuals to achieve behaviour change.[200]

2.3.13. Hands should be washed with soap and clean water before preparing or eating food

Diarrhoeal disease is a major cause of mortality in South Africa, specifically for young children and those living with HIV/AIDS, another leading cause of death among children under 5 years (cause of 19.5% of deaths in 2012).[219,220] In 2012, 16% of deaths of children younger than 5 years were due to diarrhoeal disease, according to the second South African national burden of disease study.[219] National statistics representing causes of death in 2016 reported 6.6% of deaths among those between 1-14 years of age due to intestinal infectious diseases.[221] Hygiene practices, safe water and sanitation are paramount to reducing incidence and prevalence of infectious diseases.[222] The key to addressing preventable infectious disease incidence is to help healthcare workers and caregivers who take care of young children to understand how these diseases are spread (e.g. through the oral/faecal route and contaminated water) and therefore how and when they can be avoided.[223]

Clean water supply is not readily available to all in SA, as demonstrated by the ~6 million children living in households without on-site access to safe drinking water.[224] In many cases, especially informal settlements, water must be accessed at communal points a short distance from individual dwellings. Such water can either be clean and safe or already contaminated.[224] Even if the water is clean and safe upon collection, water storage (e.g. if not covered and if stored in crowded areas) can result in microbial contamination of water. Water can be made safe either through better storage or treatment at household level (e.g. boiling water or adding sodium hypochlorite, found in cleaning bleaches).[225,226] Studies in Uganda and Peru [227,228] showed that improved toilet facilities, water sources and overall sanitation were linked to child growth - those with better resources were less likely to contract diarrhoeal disease or become stunted. Hand-washing with soap and water remains an easy, effective way to decrease the risk of diarrhoea.[229] Affordability and accessibility of soap poses a challenge for those with lower income and in informal or peri-urban areas and can have a detrimental effect on personal hygiene.[230] It has been shown, however, that using water alone for hand washing can decrease diarrhoeal disease prevalence.[231] In South Africa,

distance from taps or water sources can also reduce implementation of the guideline.[223] The information provided with this guideline emphasises the need to wash hands regularly after everyday activities such as after going to the toilet or changing a baby's nappy, cleaning bins, coughing, sneezing or blowing your nose; before eating, breastfeeding or expressing breast milk, cooking or working with food; and after working with raw foods during cooking.[232] In terms of infant and young child feeding practices, paying attention to cleanliness of the cooking area, equipment, utensils and cloths used for cleaning are important. Preparing food should consist of using only clean water, cooking food well, storing and re-heating food appropriately. It is advised that food should be consumed as soon as possible by younger children, and to avoid storing food for any time period to minimise the opportunities for micro-organisms to survive and spread.[233]

Primary healthcare plays an enormous role in addressing hygiene and food safety issues through educating mothers/caregivers. Appropriate education on food safety, hygiene and sanitation is as important as vaccinations, vitamin A and zinc supplementation to prevent child illness and optimise growth and development.[234] Personal and food hygiene education should be part of all health facility visits and in child learning/care facilities. Once again government, non-government and private role players must be involved in promoting safe hygienic practices through training and educating health workers, educators, caregivers and the general public as well as inspecting health and learning facilities, ensuring provision of acceptable quality water.[223]

2.4. Summary and motivation for the current study

2.4.1. Factors influencing implementation of FBDGs

The WHO and FAO identified FBDGs as one of the tools to optimise dietary intake, overall health and to reach vulnerable populations with limited resources to improve eating habits and nutrition of country popultions.[4] Even though several countries have developed FBDGs as recommended, there is still a lack of local implementation due to an apparent lack of capacity to provide education for successful implementation, especially in resource-poor environments.[3] An important factor in considering nutritional messages and education is the complex nature of consumers (behaviours and motivation) - the target audience for the FBDGs. Other significant factors influencing development and implementation of FBDGs include the credibility of nutritional information, the evolutionary nature of nutritional health knowledge and emerging evidence upon which recommendations are based, and the fact that there are many non-standardised channels of communication regarding nutritional information.[5] Therefore, composition and wording of such guidelines should be carefully considered and tested among consumers before being disseminated at national and local levels as acceptable recommendations for countrywide populations.

2.4.2. Research impact and future recommendations

Major factors in developing efficacious FBDGs include evaluating whether the public can understand and use the guidelines and considering the involvement of fundamental role-players and stakeholders, since implementation of SA PFBDGs spans across a variety of other sectors, not nutrition alone. Therefore, developing practical appropriate guidelines to incorporate at national and provincial, community and individual levels involves complex assessments of the social, economic and agricultural environments that affect food availability and food security. Qualitative research, specifically focus group discussions (FGDs), can provide rich insight into the benefits and downfalls of the FBDGs prior to national adoption and how to improve the guidelines in the future.

The broad aim of the current study was to evaluate the understanding and subsequent applicability of the revised SA PFBDGs. FGDs have proven useful in research seeking to evaluate and refine educational programmes. FGDs have also been used in health research to explore subjective elements of healthcare as well as complementing quantitative health research.[235] Focus groups provide a comfortable, dynamic group setting, advantageous for exploring opinions and viewpoints on relevant topics with minimal interference by the researcher.[235,236] FGDs are also the method of choice, according to FAO's guidelines, for gauging understanding among representative country populations after which individual interviews are suggested for more detailed information.[4]

Qualitative findings could also be instrumental for further research and guiding future quantitative studies. The aim of this qualitative research is to strengthen the SA PFBDGs so that they can be implemented through the DoH's official endorsement. Study findings could also be informative for developing additional educational material for mothers/caregivers and young children.

Future research will be needed to evaluate and monitor the nutritional health progress made with the new SA PFBDGs. Identifying and addressing barriers to understanding and application of the guidelines can only help towards increasing the accessibility of best evidence-based nutrition information, by different population groups (in various social, economic and biological circumstances). Monitoring and evaluation can contribute toward exploring the complexity of the public health issues in South Africa and provide information concerning the roles of various environmental, social and economic factors as well as sectors of the government. In this way researchers need to collaborate with national and local government sectors and address public health issues in a more holistic and effective manner.[5]

CHAPTER 3: METHODOLOGY

3.1. Introduction

This qualitative study was conducted in towns situated along the West Coast in the Northern Metropole of the City of Cape Town district in the Western Cape Province of South Africa. Afrikaans, isiXhosa and English speakers were sought for the study and communities were purposively selected according to inclusion criteria. Participants were recruited and participated voluntarily in focus group discussions in their preferred language.

3.1.1. Research Question

Are the revised SA PFBDGs appropriate and understandable amongst mothers/caregivers of children aged 3-5 years in the Western Cape Province of South Africa?

3.1.2. Aim and Objectives

Aim: To determine the appropriateness and understanding of the revised SA PFBDGs amongst mothers/caregivers of children aged 3-5 years in the Western Cape Province of South Africa.

Objectives:

a) Assess the appropriateness of the SA PFBDGs in terms of the mother's/caregiver's understanding and interpretation thereof
b) Assess the relationship between the understanding and interpretation of the guidelines with regards to the mother's/caregiver's socio-economic status, culture, home language and type of settlement (i.e. urban formal and urban informal dwellings)
c) Determine previous exposure to similar guidelines
d) Determine the barriers and enablers to the implementation of the guidelines

3.2. Study design

A qualitative, descriptive, cross-sectional study design was applied. Through qualitative research, it is possible to obtain detailed, contextually relevant information regarding selected participants' opinions and attitudes both of which ultimately motivate behaviour. [235,237]

3.3. Selection of the study site

There are six districts in the Western Cape Province, namely City of Cape Town, Cape Winelands, West Coast, Central Karoo, Overberg and Eden. This study was conducted in the City of Cape Town district, specifically in the Northern Metropole in Atlantis and surrounds, including Witsand, Du Noon and Blouberg areas. This area (Figure 3.1) was chosen for its access to urban formal and urban informal areas as well as isiXhosa, Afrikaans and English communication opportunities. Furthermore, the Division of Human Nutrition, Faculty of Medicine and Health Sciences, Stellenbosch University has an existing service learning arrangement with School Health Services in these communities.*

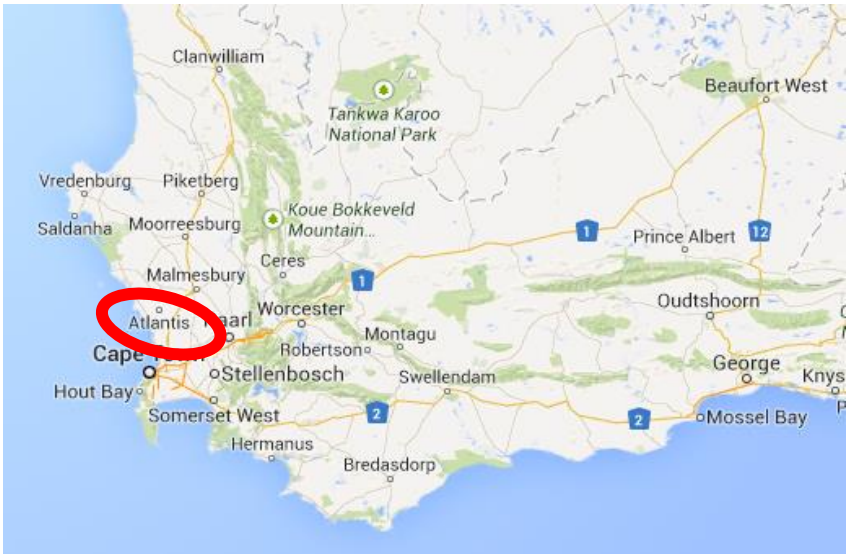

Figure 3.1: Map of the study area, along the West Coast in the Northern Metropole of the City of Cape Town district in the Western Cape Province of South Africa. Source: http://google.co.za/maps

3.4. Study population

Study participants were the mothers/caregivers of children between the ages of 3-5 years residing in the Atlantis, Witsand, Du Noon and Blouberg areas in the Western Cape Province during data collection. Mothers/caregivers referred to all women over the age of 18, who had children in the age range of 3-5 years or had taken care of children aged 3-5 years, including grandmothers, other female family members, female babysitters and female crèche owners.

* *Academic service-learning is a teaching methodology that utilizes community service to help students gain a deeper understanding of course content, acquire new knowledge and engage in civic activity. In other words, academic service-learning brings course material to life while helping students to grow personally and to develop a sense of civic responsibility (Stacey, Rice and Langer 1997:1).*

Women were chosen as they usually make the feeding decisions for their infants and children. Although men or partners may provide support for mothers and caregivers or even act as caregivers themselves, women remain the primary carers and decision makers regarding infant and young child feeding.[238–240]

3.4.1. Inclusion criteria

- Mothers/caregivers of children between the ages of 3-5 years, residing in the selected areas in the Western Cape Province.
- English, Afrikaans or isiXhosa speaking mothers/caregivers.

3.4.2. Exclusion criteria

- Mothers/caregivers who did not give informed consent.
- Mothers/caregivers with formal training in nutrition.
- Mother/caregivers who were not permanent residents of the chosen study sites.
- Mothers/caregivers under the age of 18 years.

3.5. Sample size

The sample size could not be pre-determined due to the qualitative nature of the research. Rather, sample size only became apparent once data saturation was reached, i.e. the point during data collection at which no new information was learned.[241] According to the FAO/WHO FBDG framework,[4] up to three focus group discussions per area can provide sufficient information. As the SA PFBDGs need to be acceptable and practically usable across different cultures and languages, and socioeconomic and physical environments, a target of six to nine focus groups was set to be conducted in the selected areas, in order to allow two to three discussion groups per area and language of preference. One isiXhosa, one Afrikaans and one English pilot test were conducted. Nine official FGDs with a total of 55 participants were conducted, after which a sense of data saturation was realised as data became repetitive. Please see Figure 3.2: Sampling technique.

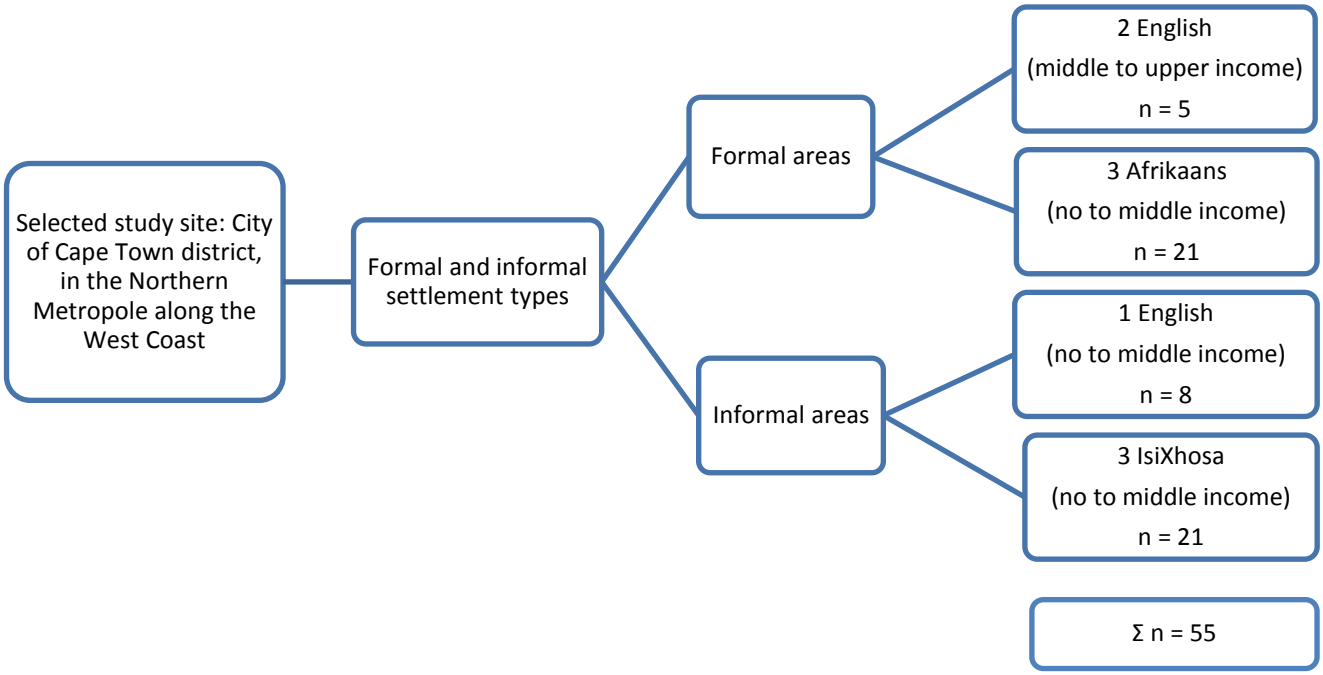

Figure 3.2: Sampling technique

3.6. Sampling strategy

As the newly revised SA PFBDGs need to be appropriate for use by all South Africans, they needed to be tested in areas that are representative of the diverse South African society. Purposive stratified sampling according to settlement provided a selection of formal or informal urban areas for data collection. As the selected study sites fell within peri-urban regions, formal and informal urban areas were further distinguished, based on employment data and the type of dwelling in the groups from the different areas. Based on the Statistics South Africa (Statssa) classifications; [242,243] Atlantis and Blouberg fell within the 'formal dwelling' category, and Witsand and Du Noon within the 'informal dwelling' category. All areas fell into the urban area category. Based on the Statssa Income dynamics and poverty status of households survey in 2011,[244] statistics on average household level incomes for the study sites [245] and the participants employment data; Atlantis fell within the 'no income to middle income' range and Blouberg within the 'middle to upper income' range. Participants from Witsand and Du Noon were classified as 'no income to middle income' based on participants employment data and type of dwelling.

For each of formal and informal urban areas, a target of up to three FGDs in appropriate languages, namely English, Afrikaans and isiXhosa, was set. Finally, four FGDs were held in informal areas, three in isiXhosa and

one in English. Five focus group discussions were conducted in the formal areas; three in Afrikaans and two in English, at which point answers were beginning to overlap. Recruitment of voluntary formal Afrikaans and isiXhosa speaking participants proved difficult and due to time and budget constraints, no FGDs in formal areas were conducted in Afrikaans or isiXhosa. (Figure 3.2)

A non-random purposive sampling technique that is appropriate for this type of qualitative research was implemented to recruit participants.[241] Mothers/caregivers for the FGDs were selected purposively, meaning they were considered eligible according to the characteristics specifically stipulated in the study inclusion criteria. When less than six participants per language were available in a selected area, FGDs were conducted with fewer participants to a minimum of two. Where more than eight participants, to a maximum of 10, showed up at the discussions, they were included in the FGDs. The minimum and maximum cut-offs ensured that the groups remained within the recommended sizes, and to facilitate participation from each participant, whereas larger groups can result in no contributions from some members and be more difficult to control.[246] The researcher made the decision to continue with the smaller and larger groups, since it was felt that the participants went to the trouble to show up for the discussions and it would have been inconsiderate to turn them away.[246]

Information regarding the Early Childhood Development (ECD) centres / crèche's and local churches, support groups and other Community Based Organisations (CBOs) in the selected areas were obtained from knowledgeable community members and were approached for help in recruiting participants (Addendum A). As no registered crèches were involved in the study and research was not conducted with children, no approval from the Western Cape Department of Social Development was necessary.

Eligible individuals were located at both household and community levels during the recruitment process and were invited to participate in the study. In the informal urban isiXhosa speaking areas the researcher was assisted by an isiXhosa facilitator going out into community areas and family homes to recruit participants. Recruitment forms adapted from similar studies,[93] and inclusion and exclusion criteria were used when conversing with potential participants (Addendums B and C). In addition, the FGDs were advertised on flyers handed out in public areas and private crèches (Addendum D) with information on how any interested individuals could contact the researcher, however this method was unsuccessful due to no responses initiated from the public.

3.7. Socio-demographic information

A self-administered questionnaire was used to acquire socio-demographic information such as the participant's date of birth, ethnicity and home language, highest level of education, employment status and

relation to child. All questionnaires were printed in English and explained to isiXhosa and Afrikaans participants in their respective languages at each FGD. The facilitator of each discussion was responsible for explaining the socio-demographic questionnaire and guiding participants, ensuring that all questions were correctly answered and assisted participants if they were illiterate or whenever necessary (Addendum E).

3.8. Focus Group Discussions (FGD)

IsiXhosa participants were recruited at household and community levels in Witsand with the help of a non-profit organisation and in Atlantis and Du Noon community health workers assisted with recruitment. FGDs were kept homogenous, meaning that in each group participants shared common personal or social characteristics. Groups of between two and ten participants at a time were included based on 1) socio-demographic characteristics and 2) language (English, Afrikaans or isiXhosa) to provide an environment in which participants felt at ease and able to express themselves.[235] Convenient and comfortable venues were arranged in advance, in local crèches, school classrooms or CBO. Telephone calls or household visits were made before each FGD to remind participants to attend. Transport for participants was provided as necessary. The venue was prepared on the day of each discussion and tea, coffee and muffins were provided. There was one trained facilitator in each of the English and Afrikaans discussions, who also made observational notes during these FGDs. One trained isiXhosa speaking facilitator helped to facilitate the isiXhosa discussions, during which the English and Afrikaans FGD facilitator was also present and made observational notes. Each session lasted approximately 1-2 hours, including a 10-15 minute break for refreshments. Discussion data were audio recorded.

At the start of the FGDs, informed consent was explained, and the facilitator assisted participants with authenticating their written informed consent, which included consent for audio-recording (Addendum F). To begin the discussion, the facilitator welcomed the participants and explained the main aim of the study. The FGD session outline (Addendum G - adapted from a similar study[93]) was used in every FGD to guide the facilitator in the FGD procedure and provided the questions to be asked, related directly to each of the SA PFBDGs.

The revised SA PFBDGs were translated into Afrikaans and isiXhosa and translated back to English, to ensure reliability (Table 3.1). The guidelines were printed onto A1 posters in each language and displayed at every FGD. A4 sized flashcards were also made in each language and utilised to present each guideline as it was read out to the participants. The facilitators read out each guideline, posed the questions and then allowed participants to proceed in discussing their responses, which ensured natural flow of discussion.

	Paediatric SA FBDG: 3-5 years	Voedselgebaseerde Dieetriglyne: 3-5 jaar	Izikhokelo zeDietary Guidelines: i-3-5 iminyaka
1	Enjoy a variety of foods.	Geniet 'n verskeidenheid kos.	Yitya iintlobo ezahlukeneyo zokutya.
2	Make starchy foods part of most meals.	Maak styselkos deel van meeste maaltye	Yenza ukutya okunomdla wokutya okuyingxenye yezinto ezininzi zokutya.
3	Lean chicken or lean meat or fish or eggs can be eaten every day.	Maer hoendervleis, maer vleis of vis of eiers kan elke dag geëet word.	Inkukhu ebhityileyo, inyama ebhityileyo okanye intlanzi okanye amaqanda angatyiwa mihla ngemihla
4	Eat plenty of vegetables and fruit every day.	Eet baie groente en vrugte elke dag.	Yitya iziqhamo nemifuno, ntsuku zonke
5	Eat dry beans, split peas, lentils and soya regularly.	Eet droë bone, split ertjies, lensies en soja gereeld.	Yidla ubhontshisi obomileyo, iipahla ezahlula, iilentile kunye nesoya rhoqo
6	Consume milk, maas or yoghurt every day.	Drink melk, maas of jogurt elke dag.	Hitya ubisi, amasi okanye i-yoghurt imihla ngemihla
7	Feed your child regular small meals and healthy snacks.	Gee vir jou kind gereeld klein etes en gesonde peuselkosse.	Yondla umntwana wakho rhoqo ukutya okuncinci kunye nokutya okulula onempilo
8	Use salt and foods high in salt sparingly.	Gebruik sout en kos met hoë sout-inhoud spaarsamig.	Sebenzisa ityuwa kunye nokutya okuninzi ngetyuwa ngokonga
9	Use fats sparingly. Choose vegetable oils, rather than hard fats.	Gebruik vette spaarsamig. Kies eerder groente-olies bo harde vette.	Sebenzisa amafutha ngokonga. Khetha i-oyile yemifuno, kunokuba ukhethe amafutha anzima.
10	Use sugar and food and drinks high in sugar sparingly.	Gebruik suiker en kos en drank met hoë suiker-inhoud spaarsamig.	Sebenzisa ushukela kunye nokutya kunye neziphuzo eziphezulu kwiswekile ngokonga.
11	Drink lots of clean, safe water and make it your beverage of choice.	Drink baie skoon, veilige water en maak dit you drankie van keuse.	Sela amaninzi amanzi ahlanzekileyo, akhuselekileyo kwaye wenze isiselo sakho sokhetho
12	Be active!	Wees aktief!	Sebenza ushukumise umzimba!
13	Hands should be washed with soap and clean water before preparing or eating food.	Hande moet met seep en skoon water gewas word voordat kos gemaak of geëet word.	Izandla kufuneka zihlanjwe ngesepha kunye namanzi acocekileyo ngaphambi kokulungiselela okanye ukutya.

Table 3.1: Table of the revised SA PFBDGs in English, Afrikaans and isiXhosa

The FGD session outline focused on:

- The mother's/caregiver's understanding and interpretation of each SA PFBDG
- Previous exposure to the SA PFBDGs
- Barriers and enablers to the implementation of the SA PFBDGs

The role of the facilitator was to keep the discussion relevant. Active listening, gentle probing and reflection were employed to gain a good understanding of opinions and feelings of participants. The facilitator encouraged participation by all participants as much as possible without disrupting the flow of discussion. Discussions continued until data saturation was reached.

3.9. Training and pilot studies

The researcher trained the assisting isiXhosa facilitator. A one-hour training session covered the aim and objectives of the study, the informed consent and self-administered questionnaire procedures as well as the FGD guiding questions and how to use the discussion guide to facilitate each discussion, emphasising that the facilitator should ask open-ended questions and allow participants to respond in their own time and words. Informed consent and audio-recording procedures were explained as well. The facilitator, observer and recruitment roles were fulfilled by the researcher or the isiXhosa facilitator.

One Afrikaans pilot study was conducted with a group of six participants as well as one isiXhosa pilot study with 13 participants in Atlantis and Witsand, respectively. One English pilot FGD was conducted in the informal Du Noon area, consisting of seven participants. The pilots provided practice for the facilitators, allowed them to become comfortable with the process and become acquainted with the nature of the discussions and questions posed. Brief refresher sessions were held after the pilot FGDs to ensure that facilitators allowed natural flow of relevant discussions and the discussion guide was minimally adapted. Due to the complex nature of FGDs, varied group dynamics and discussion atmospheres, facilitators adapted accordingly, as is described in literature and expected in this type of qualitative research.[236,246]

The FGD session outline guided the standard procedure for each discussion. The observer's primary role was to take note of non-verbal communication behaviour (body language, facial expressions and group interaction) as well as the context of verbal communication. The study commenced when the researcher was sure the isiXhosa facilitator understood the FGD guide and was able to facilitate the discussions.[236]

3.10. Validity and reliability

Validity and reliability were ensured as far as possible throughout this qualitative study. The standardised FGD guide was the universal manual followed by facilitators for every FGD. The guidelines were translated into Afrikaans and isiXhosa and then back translated to ensure reliability. The socio-demographic questionnaires and consent forms were explained to the participants by the facilitators during each FGD to ensure full understanding.

The practical implementation and face validity of the discussion outline was also tested in a pilot study before official data collection commenced (Section 3.9). Audio recordings were made to improve validity. During transcription, audio data were compared with the observer notes to ensure descriptive and interpretive validity.[235.]

3.11. Data and analysis

Quantitative data, collected via the self-administered questionnaire, was analysed using basic statistical calculations. Qualitative data was audio-recorded, transcribed and analysed using a process of coding and data synthesis known as "content analysis" using MS Excel 2016.

3.11.1. Qualitative data: Focus group discussion data analysis

Soon after each FGD, a short debriefing session was held with the facilitators during which they shared their observations, finalised observational notes and clarified any issues. This form of rapid analysis of FGDs helped to ascertain whether the facilitator used the discussion guide and facilitated the FGDs optimally. It also helped to identify the point of data saturation and ensured that the information collected was related to the study aim and objectives, while the information was still clear in the facilitators minds.[236]

Audio recordings were professionally transcribed in English, with simultaneous translation from Afrikaans/isiXhosa, where necessary. All observational data were added to the transcriptions. Afterwards, main topics and common interests were extracted and grouped. Coded responses were tabulated in MS Excel 2016. Responses were then related to study objectives and stated as possible recommendations for SA PFBDGs and future research areas.[241,246]

3.11.2. Quantitative data: Socio-demographic questionnaire data analysis

Data from questionnaires were recorded in MS Excel 2016 and basic descriptive statistics were identified by the researcher to reveal the characteristics of study participants. No statistician was required for the data analysis process due to the study's predominantly qualitative nature.

3.12. Ethical and legal aspects

Ethics approval from the Health Research Ethics Committee, Stellenbosch University was granted (reference number: N14/09/122). Prior to any data collection, written informed consent was obtained from each participant. Participants were clearly informed that their participation was entirely voluntary and that they could withdraw from the study at any point in time. Anonymity and protection of personal information was ensured. Participants were identified by numbers only and no names were used throughout the FGDs. Recordings and transcriptions will be destroyed at the end of the study and writing up of results.[247] Participants were each entitled to tea or coffee and a muffin at discussions and a small token of

appreciation for participating in the FGD was given in the form of yoghurt and packets of dried fruit and nuts to take home.

3.13. Summary of methodology

This study followed a qualitative, cross-sectional, descriptive study design. Selected study sites provided access to relevant participants and a representative sample of English, Afrikaans and isiXhosa speaking participants. Participants were purposefully selected according to pre-set inclusion criteria and recruited at household and community levels to take part in the study.

The study was approved by the Stellenbosch University Health Research Ethics Committee and participation was voluntary with written informed consent being obtained from each participant. Participant identities were kept anonymous. Socio-demographic information was obtained from each participant via self-administered questionnaires. Qualitative data was collected by means of audio recording FGDs and by noting observations. Facilitators were trained in the main aims and objectives of the study and familiarised with the focus group discussion guide. Pilot studies were conducted followed by nine official FGDs.

Linguistic and socio-economically homogeneous focus group discussions were held in convenient venues. The researcher facilitated discussions in English and Afrikaans and in isiXhosa with the help of an isiXhosa facilitator. The study population consisted of three groups each of formal urban Afrikaans and informal urban isiXhosa areas; one group was from an informal urban English area and two groups from formal urban English areas, comprising a total of 55 participants from nine focus group discussions. Content analysis was performed on transcribed FGD data and socio-demographic data was analysed using basic, descriptive statistics in MS Excel 2016.

CHAPTER 4: RESULTS

The study was carried out with the aim of determining the appropriateness and understanding of the revised SA PFBDGs amongst mothers/caregivers of children aged three to five years.

This chapter includes two sections, i.e. socio-demographic information and data from the FGDs. FGDs will be referred to as follows:

- isiXhosa informal: XI
- English informal: EI
- Afrikaans Formal: AF
- English formal: EF

4.1. Socio-demographic information

4.1.1. Participants' language and ethnicity

The languages and ethnicities of the final nine focus groups are as follows: 52.7% of all participants were black African, 38.2% were mixed ancestry and 9% were Caucasian. The AF groups consisted of participants from mainly mixed ancestry (96.3%). and the remaining percentage (one participant) was a black African. In the XI and EI groups the participants were all black African, whereas the EF group participants were all Caucasian. Facilitators made clear to all participants the language in which the discussion would be held. In two cases multi-lingual participants chose to stay in the isiXhosa discussion even though their home languages were English and Afrikaans, respectively. The EI groups were recruited from a linguistically diverse community, due to their competency in English communication and non-existence of native English-speaking individuals in informal areas. These participants revealed that English is often the best common language amongst the diverse dialects of the population in the Du Noon area (Table 4.1).

4.1.2. Participants' relation to children

Participant ages ranged from 20-52 years. Most of the participants in all groups were mothers of the children, shown as 77.8%, 76.2%, 80% and 100% of the AF, XI, EI and EF participants, respectively. The second most common relation was grandmother, followed by aunt and other, namely community healthcare workers or teachers (Table 4.1).

	English Informal		Xhosa Informal		Afrikaans Formal		English Formal	
	no.	%	no.	%	no.	%	no.	%
Etnicity								
Caucasion							5	100.00
Mixed Ancestry					20	95.24		
Asian								
Black African	8	100.00	21	100.00	1	4.76		
Indian								
total	8		21		21		5	
Language								
English	2	25.00	1	4.76	2	9.52	5	100.00
Afrikaans		75.00	1	4.76	19	90.48		
isiXhosa	6		19	90.48				
total	8		21		21		5	
Relation to child								
mother	8	100.00	16	76.2	17	80.95	5	100.00
sibling		0.00						
grandmother			2	9.5	4	19.05		
aunt			2	9.5				
no relation				0.0				
other		0.00	1	4.8				
total	8		21		21		5	
highest level of education								
None								
Gr. 1 - 7			2	9.5	1	4.76		
Gr. 8 - 11	8	100.00	13	61.9	12	57.14	4	80.00
Matric		0.00	5	23.8	7	33.33	1	20.00
Tertiary education			1	4.8	1	4.76		
total	8		21		21		5	
Employment status								
employed	8	100.00	4	19.0	3	16.67	5	100.00
unemployed			17	81.0	15	83.33		
total	8		21		18		5	

Table 4.1: *Study participants' socio-demographic characteristics*

4.1.3. Participants' level of education

In terms of education, there was a general trend for those in the formal areas having higher levels of education than those from the informal areas. The highest levels of education were evident in the EF groups with the majority (80%) having acquired tertiary education, one out of five participants having achieved Grade 12 and none of the participants achieving less than Grade 12. The AF participants had mostly acquired a level of education that was between Grades 8-11 (66.7%). Twenty-five percent had achieved Grade 12, and 3.7% each of participants had either managed to attain Grade 1-7 education or had reached tertiary education. This shows that there is an inconsistency in socio-economic and educational status within the same area and group of AF participants. Over 60% of the XI participants from Witsand had achieved Grade 8-11 education (secondary education). Twenty-three percent had achieved Grade 12 and just less than 10% had only completed grade 1-7 education (primary education). One out of 21 participants had achieved tertiary education. Amongst the EI groups who participated, all had attended high school and received education levels within Grade 8-11. In summary, all participants from all categories had received primary education with the majority going on to high school. From high

school onwards, the percentages of those who finished Grade 12 and went on to tertiary education dropped most noticeably in the lower socio-economic areas. See Figure 4.1.

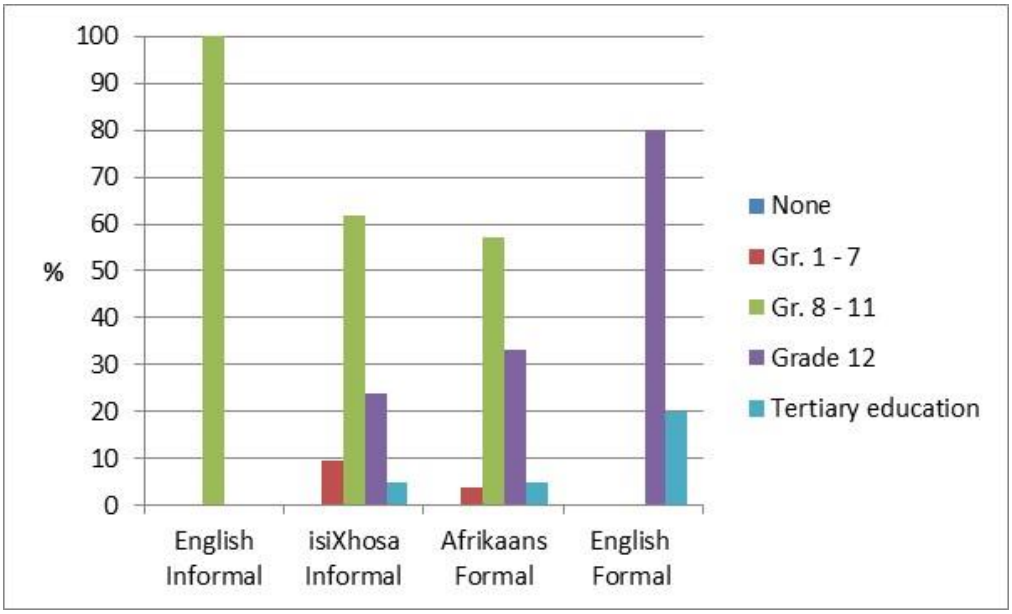

Figure 4.1: Participants' level of education according to settlement type and language

4.1.4. Participants' employment status

All the participants in the EI groups, in Du Noon and Blouberg areas, were employed and had received education of either high school or tertiary levels. It should be mentioned that the EI participants (residing in Du Noon) were employees of the TB/HIV Care Association. These participants lived in Du Noon, provided a link to the community and insight into how health and nutrition messages were received by the community. Over 60% and 23% of the AF and XI groups had received high school education and achieved a Grade 12 level of education, respectively, but remained largely unemployed. Looking at the AF groups in Atlantis, 83% fell within the unemployed category. Among XI participants from Witsand, 81% were unemployed (see Figure 4.2).

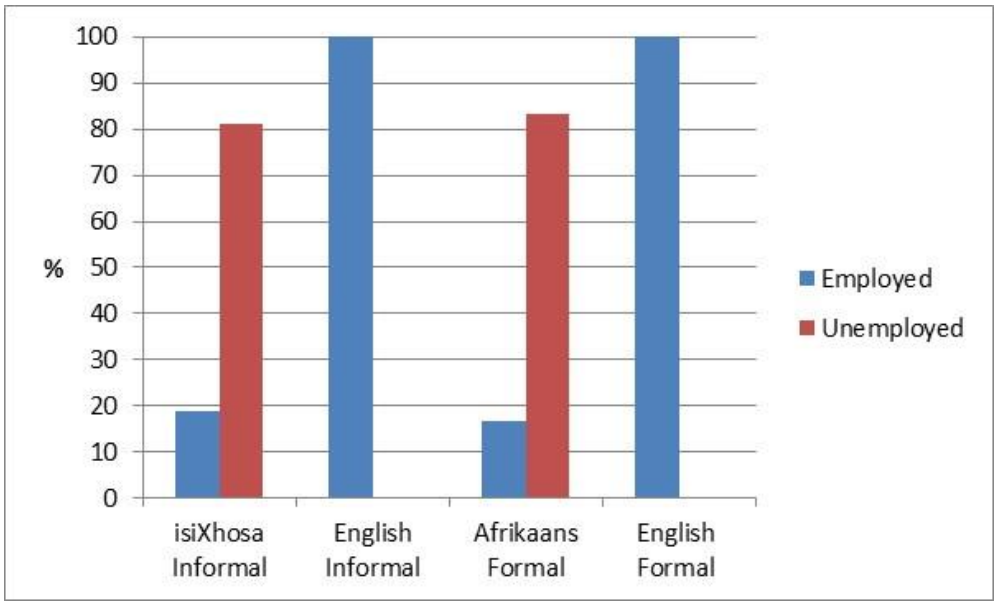

Figure 4.2: Participants' employment status according to settlement type and language

4.2. Focus Group Discussion (FGD) data

FGD data were audio-recorded and transcribed. Meaningful findings were grouped according to the study objectives and are reported below.

4.3. 'Enjoy a variety of foods'

4.3.1. Previous exposure to similar guidelines

Among the XI groups, some participants had never heard of the guideline in this format but knew that different foods should be eaten. One participant mentioned working for a catering company where she had heard of it. Others had heard about this in clinics or at schools and specifically mention that they thought that fruit was important.

Some AF participants had heard of this guideline at schools or health facilities. Others had visited dietitians, where they had heard of the importance of making sure that children become familiar with a variety of foods and what to do when the child is malnourished or not gaining weight. Others had heard of this through working with children and described the importance of the children being exposed to different foods. The EI participants had learnt this from dietitians, clinics and schools. The EF participants had *"seen this everywhere"* and mentioned adverts for well-known supermarkets. They remembered learning it for the subject Home Economics when they were in school and hearing it from dietitians. They had also seen it

through their medical aid and in children's complementary feeding books which described giving a variety of foods to help with food development and to create interest in different foods and tastes.

4.3.2. Appropriateness of the guideline in terms of the mother's/caregiver's understanding and interpretation of the guideline

Across all groups there was a shared understanding of 'variety' which was described as different colours and food groups. Vitamins and minerals were recognised as nutrients from a variety of foods, particularly from fruits and vegetables, which were considered important for growing children.

The AF groups spoke about the importance of providing different types of foods to their children, one participant stating: *"Because, you have to for your child, the child's development, you have to give him different foods, so that he can become used to it and that, so that he can't say, 'I, I don't like this'. It is very important to make them used to different tastes." FGD: AF2, P: 5 to Rohrs (2017).* One participant expressed concern for giving children certain foods at certain times of the day, stating that she would like to know what foods are best to give when: *"Maybe not give apples in the evening, because it contains acid, then their tummies ache. We also need to know which kinds of food, which times, in the morning, afternoon or in the evening." FGD: AF2, P: 4 to Rohrs (2017).*

Despite acknowledging healthy and unhealthy types of food, some of the EI participants interpreted 'variety' as *"lots"* or *"plenty"* of food, without considering healthy or unhealthy properties.

The EF groups mentioned the importance of including all food groups as part of a nutritious diet for children, i.e. *"not cutting out any food groups" FGD: EF2, P: 1 to Rohrs (2017)* and said that *"it brings it down to having a balanced variety of all the different food groups. Whether it's your fats, your carbs or proteins, but having a variety of them to give your body all the needed nutrition." FGD: EF1, P: 1 to Rohrs (2017).*

4.3.3. Understanding and interpretation of the guideline with regards to the mother's/caregiver's socio-economic status, culture, home language and type of settlement

All groups shared the belief that different foods provide different, necessary nutrients, saying: *"It's a must to eat different food types like when you eat vegetables, there are vitamins from vegetables, when eating fruit, there are vitamins from fruit, so that's why it's a must that we eat different types of food." FGD: XI1, P:*

8 to Facilitator (2017; "Yes, I think that it's important because there are different nutrients in each food group." FGD: EF2, P: 1 to Rohrs (2017); and *"It's very important, yes, because children need lots of fruits and vegetables. They provide different 'nutritions' and things, those vitamins and such." FGD: AF4, P: 4 to Rohrs (2017).*

The AF, EI and EF groups indicated that variety is important because it keeps meals interesting and different colours make meals more appetising. The EF and AF caregivers agreed that variety is important so that children do not become attached to a limited range of foods and to help them to develop healthy eating behaviours from a young age. The AI participants said: *"Then one will be able to find out what the child is allergic for, maybe, in a variety of foods." FGD: AF2, P: 2 to Rohrs (2017)* and *"they must have a variety of different types of food. They can have their luxury food and they can their healthy food. But more the healthy food." FGD: AF2, P: 1 to Rohrs (2017).* Some participants in the EI groups felt that eating a lot of food (according to their interpretation of 'variety') could result in weight gain and health complications.

4.3.4. Use of the guideline to plan meals on a daily basis

Generally, throughout the groups, there was talk of their children's unwillingness to eat vegetables. The isiXhosa participants spoke about the inclusion of different foods for different meals, but that the children would not eat the vegetables because they have *"no taste"* and they do not like it, whereas the adults are more likely to eat it because they know that it is good for them. *"Kids mostly don't like vegetables, they don't like it at all, they put it on the side if you give them (vegetables) and most of the time they eat food with no vegetables." FGD: XI4, P: 3 to Facilitator (2017).*

Some of the AF participants stated having no problem implementing this guideline in their homes. EI participants felt that they are currently following this guideline. Among the EF groups there was consensus that this guideline should be implemented at home and that they do offer their children a variety of foods. One participant stated that her child does not eat lots of vegetables but will *"when she is ready." FGD: EF1; P: 2 to Rohrs (2017)*, potentially indicating a lack of belief in the importance of vegetables.

4.3.5. Barriers/enablers to implementation of the guideline

Potential implementation barriers pointed out by AF groups include affordability, planning and time. They described getting home too late from work and not being able to afford cooking a variety of foods. Healthier options (e.g. lean meats) were described as not being available in their community and expensive if they were available. Some participants admitted to being lazy and unable to force their children to eat vegetables. Participants exchanged ideas to improve consumption of healthy foods such as offering dessert

as a reward for eating vegetables and giving fruit during the day. Participants felt that the public would implement this if they were motivated and suggested growing their own vegetables as motivation, but stated that time and money were real constraints.

One EI group admitted to liking fatty foods and not following the healthy guidelines. Other EI participants agreed that one should have starchy foods and vegetables but that fatty foods were not always necessary. EI participants discussed the affordability of a variety of foods for people in their community, saying *"They are unemployed. So, people, they go and buy some basics like mielie (maize) meal, rice, there's a lot of starch, instead of vegetables and fruits, because there's no money to buy the healthy foods. So, instead of that, they buy the basics for their living." FGD: EI3, P: 4 to Rohrs (2017).* Lack of knowledge and cultural differences were mentioned as barriers to implementation of this guideline. EI participants pointed out that, culturally, the isiXhosa people liked to eat starchy foods, stating *"also the cultures… Like isiXhosa, sometimes we eat starchy foods, like samp, maybe mielie (maize) meal, rice, because we want our stomach to be full. The vegetables, they don't make you full, for the hours. You see if you eat at 9 o'clock, you gonna eat like tripe, or affal, because your stomach will soon end. We work hard, so we must have a full stomach. Vegetables just go through, they don't give you energy to work." FGD: EI3, P: 1 to Rohrs (2017.)* EI participants felt that it is important to educate their children to be interested in different foods and to grow up knowing how to eat healthily. Planting your own vegetables was described as the best way for children to learn.

EF groups agreed that the guideline can be followed, that it keeps meals interesting and variety is more available and affordable than in the less formal areas, allowing them to have more than just the staples every day. EF participants felt the guideline will be understood, stating that it depended on the generation receivers of the message are from and that older generations might be less likely to offer children a greater variety of foods or to experiment with a greater variety of foods. They discussed creativity and variety in cooking with the same ingredients, but that some people are too stuck in their ways to do so.

Generally, all participants agreed that this guideline was one that they could follow. However, they were concerned about the availability and affordability and about the ability of the general South African public to understand the term 'variety'. AF and EF participants indicated that the guideline would need a bit more background and explanation, even though it is reasonably easy for them to understand. There was concern for possible misunderstanding of the Afrikaans word for "variety", i.e. 'verskeidenheid'. A suggestion was offered to change the wording to *"verskillende kosse", i.e. 'different foods'*.

4.4. 'Make starchy foods part of most meals'

4.4.1. Previous exposure to similar guidelines

XI groups were aware of the guideline, stating that this is something that they do already. AF groups had come across the guideline *"everywhere"*, mentioning healthcare facilities, schools and visits from home-based carers. Most participants had heard of it at home and learned from their parents that starch fills your plate and satisfies you. Participants named well-known starchy foods including porridge, pasta and potatoes. Participants spoke about the importance of not eating too much starch (more for adults) but that they always include starches when they cook a meal as they believe it is important to keep the children fuller for longer and away from unhealthy snacks between meals. One response was: *"But because it's children, there must be, for them to get full, there must then be rice or a potato… that's, that's the starch. So then maybe they do not get hungry right after meals for 'luxuries'. Then that's the starch that has filled them." FGD: AF2, P: 2 to Rohrs (2017).* There was a general feeling that this is something that does not need to be taught, but participants felt that they give more starches than appropriate as it is more affordable than fruits, for example, which they give when they can. EI groups also mentioned that they had grown up with this: *"In our household, like when you cook a meal, you only cook starch sometimes. Only starch, if you eat pap in the morning and then you make pap again in the evening. So that is starch and starch." FGD: EI3, P; 3 to Rohrs (2017).* In contrast, the EF group had not heard of or seen this guideline. However, they had seen the different food groups before, i.e. vegetables or starch, and spoke about rather using the word 'carbohydrates.'

4.4.2. Appropriateness of the guideline in terms of the mother's/caregiver's understanding and interpretation of the guideline

All groups understood the phrase 'starchy foods' and listed food items such as rice, potatoes, pasta, maize meal, spaghetti, lentils and sugar beans and indicated that they are very affordable. Participants reiterated that they believed that starchy foods can cause weight gain and feared making their children obese, but also felt that this was balanced by the fact that 3-5-year-old children need the energy to grow and play.

Mothers in the EF groups pointed out that there are starchy vegetables as well, like sweet potatoes, carrots and corn. A participant believed that *"as soon as you combine starch with proteins, the proteins are able to break down the starches in your process." FGD: EF1, P: 1 to Rohrs (2017).* In the other EF group *"all the addictive things" FGD: EF2, P: 2 to Rohrs (2017)* were classified as starchy foods. The EF group expressed unease regarding the use of the word 'starchy', pointing out immediately that it sounds unhealthy and

associating it with unhealthy fast foods, jokingly rephrasing the guideline as *"make McDonalds part of every meal". FGD: EF2, P: 2 to Rohrs (2017).*

With regards to the phrase 'part of most meals', all the participant groups mentioned main meals as being three, or at least two, meals a day. It was acknowledged that it does not need to be so for every meal and should not be too much. An EI participant, however, stated that *"every time you cook you have starch on your plate." FGD: EI3, P: 1 to Rohrs (2017).* A typical day was described as eating bread or pap in the mornings, bread when you come home and then rice or pap in the evenings to give you energy. AF participants explained that they make sure that there are potatoes or rice with any main meals and porridge or toast with eggs in the mornings. Mothers/caregivers gave afternoon snacks, like a peanut butter sandwich a while after meals. For others, 'most meals' was interpreted as only in the evenings. The EF mothers mentioned that when they see the word 'starchy' they think of dinner and that not everyone eats three times a day. They felt that starchy foods should definitely be part of your main meals – whenever that may be.

4.4.3. Understanding and interpretation of the guideline with regards to the mother's/caregiver's socio-economic status, culture, home language and type of settlement

Generally, the overall feeling in all groups was that starchy foods are important to provide energy and satiety to children. Some participants were aware of overindulging in starchy foods and understood that this can cause unhealthy weight gain. XI participants indicated that they followed the guideline every day and their children were accustomed to eating starchy foods for most meals, being familiar and filling. AF participants agreed that starchy foods must be eaten every day, in moderation. They had heard from the clinic that many children are overweight for their age and that different foods can affect children differently. EI and EF participants noted that it is important to include a variety of starchy foods throughout the day (e.g. breakfast, lunch and supper), but also to have vegetables and not to cut out any food groups.

The EF participants particularly emphasised negative effects of starchy foods that they had heard of or read about. However, for 3-5-year-old children who burn a lot of energy, carbohydrates were still considered important. Participants agreed that if given the opportunity, children would only eat starchy foods because they enjoyed them so much. Two participants responded saying: *"My daughter only likes starch, it's all she eats (rice, bread)" FGD: EF1, P: 2 to Rohrs (2017)* and *"whenever the boys are hungry they ask for a sandwich or a yoghurt." FGD: EF1, P; 1 to Rohrs (2017)*. EF mothers included starchy foods daily but tried to include those that they believed were healthier options, e.g. sweet potato and pasta.

4.4.4. Use of the guideline to plan meals on a daily basis

All groups followed the guideline and considered it appropriate in terms of understanding and availability in their respective environments.

4.4.5. Barriers/enablers to implementation of the guideline

All participants felt that the general public would understand and be able to follow the guideline as it is affordable and traditionally accepted.

4.5. 'Lean chicken or lean meat or fish or eggs can be eaten every day'

4.5.1. Previous exposure to similar guidelines

For this guideline, responses ranged from some participants having never heard of the guideline among XI, AF and EF groups, to participants in every group being aware of it and having seen it or heard it before. Common sources of information included doctors, clinics, health facilities, crèches, television and radio among the AF, XI and EI groups as well as magazines, *"the food pyramid"* and medical aid companies among the EF mothers.

4.5.2. Appropriateness of the guideline in terms of the mother's/caregiver's understanding and interpretation of the guideline

XI participants pointed out that the fatty parts of these foods can cause diseases and it is better to eat the lean options on a daily basis. Some AF group members were unsure about the definition of 'lean' but explained that eggs and fish were healthier protein options. One group member explained: *"I think lean chicken is when they cut off the excess fat, the skin. Because these days we get skinless chicken. But we like to eat the skin that they remove, it must be nice and crispy. Know that that is lean chicken." FGD: AF2, P: 1 to Rohrs (2017).* They were aware that 'skinless' chicken is available but also responded jokingly, saying: *"It's probably the smaller chickens - but all the chickens in Atlantis are fat!"* FGD: AF2, P: 3&4 to Rohrs (2017), indicating a strong attachment to the taste of fatty chicken. Other participants' responses included: *"To me, lean means that I must cut off the fats" FGD: AF1 P: 4 to Rohrs (2017); "Often it is not labelled as 'lean' we just get the fatty parts here" FGD: AF1, P: 3 to Rohrs (2017)* and *"It is something that does not contain a lot of fat" FGD: AI4, P: 5 to Rohrs (2017)*. The guideline was interpreted as: *"you can eat these foods every day, there isn't a meal where you can't include these foods, even on the weekends." FGD: AF1,*

P: 4 to Rohrs (2017). Group members pointed out that the meat and eggs are fine, but that there are bones in the fish, making consumption hazardous for young children.

The EI groups also described 'lean meat' as the meat without the skin and with less fat but also admitted to enjoying the taste of the chicken skin. Healthy cooking methods were discussed, including that eggs can be boiled, or fried using only a small amount of oil and suggesting that one can also steam fish – i.e. that oil is not always necessary.

An EF speaker described lean as *"obviously the skinless chicken, fatless meat, that's protein." FGD: EF1, P: 1 to Rohrs (2017).* Another participant responded that she was not sure what 'lean' is defined as, saying: *"it's not a fatty meat so I'm not going to buy the lean chicken instead of the normal chicken." FGD: EF2, P: 3 to Rohrs (2017). "Skinless", "fatless"* and "*grilled"* were descriptive terms mentioned in these FGDs and it was added that meat should not be processed, fried or battered.

4.5.3. Understanding and interpretation of the guideline with regards to the mother's/caregiver's socio-economic status, culture, home language and type of settlement

The AF participants stated that this type of food is already eaten daily, and that chicken and eggs are commonly chosen because they are cheap. All groups identified these foods as sources of protein, necessary to build up the child's body. EI participants discussed financial constraints of eating the way they are being taught to, saying that sometimes they can only afford these foods at the beginning of the month. They explained the prevention of chronic diseases in the future by teaching the children what is healthier at a young age, i.e. *"To cut out the number of obesities… and also to protect against other diseases like heart… problems with your heart like she (referring to another group member) said, the hypertension…" FGD EI3, P: 3 to Rohrs (2017).*

All FGDs described the importance of including these foods in the diet. XI participants felt that eating healthy foods is important: *"It's a must because you're always in good health when eating lean food, you don't get affected by diseases and some diseases can't affect you because you eat healthy food." FGD: XI1, P: 5 to Facilitator (2017).* They also mentioned that eggs are good for children as they provide proteins and vitamins. Responses from AF participants were congruent with those from the XI groups in terms of the nutrition provided from these foods. They also indicated that the children already learn that chicken and fish are healthier than red meat. The EI groups in Du Noon discussed the importance of children eating these foods. Others also mentioned that it is important to reduce the use of oil to avoid obesity or diabetes

and to prevent heart problems. The EF responses were similar to those of the other groups, stating: *"Because protein builds muscle, and as soon as you build a child's muscle through healthy protein, they're going to end up being stronger…. Instead of building it up with bread… or empty carbs, as cereals and stuff like that… Well you need the protein and the starch together, to give you the energy." FGD: EF1, P: 1 to Rohrs (2017).*

4.5.4. Use of the guideline to plan meals on a daily basis

All groups stated that they followed the guideline. XI groups said that they try to eat eggs or fish and do not eat meat every day. AF participants said that *"most people eat this - it's an everyday food… We only buy chicken." FGD: AF1, P: 4 to Rohrs (2017).* One participant even mentioned that her children eat chicken every day as they prefer chicken to red meat, and therefore she always keeps chicken in her fridge. Meanwhile, others felt that these food items are expensive and cannot be eaten every day. Towards the end of the month they will more likely be eating just jam and bread.

EI groups reiterated the issue of affordability, saying: *"There is no money… to buy all the time to keep red meat in the fridge and, also, you have eggs in the fridge… no money… and you've got sometimes two children, three children. The first make five eggs, the first boy makes five and the second girl makes four. So within a week there's no eggs at all and then they gonna wait until the month end. I will decide to not buy it, because there is no order." FGD: EI3, P: 4 to Rohrs (2017).* An example of other ways of including these items in the diet was eating tinned fish with spaghetti. Tinned beans were also mentioned as a favourite and there was mention of buying lean mince. One participant said that they preferred skinless chicken. Some EI participants explained that they had grown used to the taste of fatty meats from when they were younger which makes it difficult for them to adapt to lean options: *"We are supposed to teach our children to grow and know that fats are not good for their body. Because even me too, although I like meat, it's because of my family they always say that the fats are for the children, and you enjoy it and you adapt it… you grew up with that and then now, I don't like vegetables, the lean chicken, I can't eat it." FGD: EI3, P: 3 to Rohrs (2017).*

EF mothers responded: *"Yes, we definitely do" FGD: EF2, P: 3 to Rohrs (2017)* to following the guideline. There was talk of 'meat-free' days. One participant said that she always cooks lean meat, but she cannot say the same for her husband when he cooks: *"Because, I say, we don't eat that every day, we have meat free days that we like to do. So, we generally will just have pasta, or a vegetable bake, or something... but when I cook it's lean, when my husband cooks it's not always lean." FGD: EF2, P: 2 to Rohrs (2017).*

4.5.5. Barriers/enablers to implementation

A worthy barrier brought to attention by the XI groups was that the lean meats are tasteless to them and make them unhappy, but they also said that the children can follow the guideline because they like the lean foods. Taste was also raised as a barrier among the EI participants, who mentioned that when they are told by the doctors that they need to lose weight they do not know how to do so.

AF participants felt that following or implementing the guideline is subject to the financial status of the family, especially those which get monthly child grants; *"Yes, in Atlantis, most of the people get child grants, they will not be able to have meat or fish every day, then it's mostly bread with peanut butter or baked beans that we give our children…" FGD AF:1 P: 6 to Rohrs (2017)* In contrast, one EF participant indicated that she plans what her family eats around the protein, and that the vegetables and everything else will be added after that. The AF participants went on to state that 3-5-year-old children would be able to follow the guideline and that they usually make sandwiches with peanut butter, baked beans or eggs, which they described as a bit healthier. They were concerned that some people will not understand the term 'lean.' Using *'fat-free'/'skinless'/'boneless'* or *'meat with less fat'* or to mention *'red meat'* instead were offered as suggestions, while some participants felt no need to change the wording. EI groups were also concerned that members of their community would not understand the wording 'lean meat' and that they would rather eat the way they know and grew up with and that is affordable to them. EF participants felt that the guideline was understandable as is and mentioned no need for modification. They confirmed that this guideline had been taught to them since their school days.

4.6. 'Eat plenty of vegetables and fruit every day'

4.6.1. Previous exposure to similar guidelines

XI participants had heard this information at the clinic, on television, on radio and in magazines. In addition to these sources, AF participants from Atlantis had heard of the guideline at schools, crèche's, as children at home and at church. They spoke about children being taught that it is important to eat fruits and vegetables every day at crèche, where they are also given an apple or a seasonal fruit with their lunch. Participants agreed that this is something that children should learn early on. Colourful fruit salad was a trick employed to get children to eat fruits if they did not enjoy them. EF participants agreed with this guideline and said: *"Yes, it has been drummed into us since we were little" FGD: EF1, P: 2 to Rohrs (2017).*

4.6.2. Appropriateness of the guideline in terms of the mother's/caregiver's understanding and interpretation of the guideline

"It's vitamins" FGD: XI2, P: 1 to Facilitator (2017) was the response from one XI participant after being asked what they understood by this guideline. 'Lots' was generally interpreted as *"regularly", "every day", "to eat enough", "I can give it to her anytime", "the most or plenty"* and *"much more than starch and meat."* Afrikaans participants seemed concerned about when these foods should be eaten, saying that they should be avoided at certain times, especially in the evenings, because fruits (e.g. oranges or apples) can give the children stomach cramps during night. There was mention of not giving too much fruit or *"not over the limit"* which was described as: *"if she just had a meal and a fruit and she asks for another fruit, then I will say she can have it later. Not just that she can have more than she should because it is healthy." FGD: AF4, P: 4 to Rohrs (2017).* One participant in the EF groups mentioned that she had also heard that fruits can contribute to weight gain, stating: *"But apparently fruits are also quite fattening. There's a lot of… sugar in fruit… so only… which fruits have got lots of sugar in? It's more the fruit juices… because they contain a lot of sugar" FGD: EF1, P: 2 to Rohrs (2017).* She went on to describe that fresh fruits are not what they used to be, and that they have become tasteless. The EF group were on the same level as the other groups saying that this information was everywhere and that *"everyone always tells you to eat your vegetables, since you were small and growing up." FGD: EF2, P: 2 to Rohrs (2017).* One participant mentioned telling her children to eat their vegetables countless times throughout the day. Fruit was clearly more enjoyable for children to eat according to EF participants. EF mothers speculated that group influence (or peer pressure) from other children can cause their children's sudden dislike for vegetables. They also mentioned that vegetables at the crèche's are often not cooked and are not presented in an aesthetically appealing way, putting the children off eating them.

4.6.3. Understanding and interpretation of the guideline with regards to the mother's/caregiver's socio-economic status, culture, home language and type of settlement

All groups felt that fruit and vegetables are important and nutritious, especially for growing children. XI participants expressed the importance of eating fruits every day because of the vitamins they provide, even if it is just a small amount of fruit. Similarly, the AF groups agreed that fruits and vegetables are very important and contribute positively to one's health by providing vitamins and proteins. One EI participant stated: *"Because there are many vitamins, proteins and if you eat vegetables and fruit, even if you are not ill, you can eat it. And there is no guideline to eat five apples a day, you can eat more… no limit," FGD: EI3, P: 1 to Rohrs (2017)*.

Fruit and vegetable consumption was positively associated with growth and brain development: *"It makes you healthy … I feel it is healthy, because it helps with the growth and the brain development, all that" FGD: AF2, P: 5 to Rohrs (2017)* and *"It's nutrition. So, I mean, obviously an organic type of meal based with a lot of fruit and vegetables, well, vegetables and a bit of protein and a bit of starch is going to be much more nutritionally valuable to you at parties, than just a slice of bread with peanut butter and syrup." FGD: EF1, P: 2 to Rohrs (2017).* EF participants also indicated that they feel better and more awake and alert after eating lots of vegetables and that this must be good for children as they are growing and learning. Children were described as tired and *"energy-less"* when they have not had enough vegetables.

4.6.4. Use of the guideline to plan meals on a daily basis

Generally, all participants agreed that they try to follow this guideline in their homes daily and indicated that fruit was generally preferred to vegetables amongst children. XI participants mentioned that they sometimes shared these foods with their neighbours. EI participants mentioned affordability and government child grants; *"on first grant day, we buy the apples, R20 at Shoprite, take 5 on one day. You see, so there is no order in the house, they take it all the time, they'll take it and they'll finish with 5 days, that week. So there is no order you just leave, you decide you don't buy it" FGD: EI3, P: 1 to Rohrs (2017); "I think because of money, it's a very difficult thing. I think if you've got money, you always buy some fruits, and vegetables... you've got the money on the first day of grant to buy the bag of apples, so they enjoy the thing for one day they take their 5 apples per person but if you've got that bag of apples every day, regularly, they can't take 5 apples every day so, I think the thing is people don't have money to buy the those things." FGD: EI3, P: 4 to Rohrs (2017)* and could not all say that this guideline is followed daily. Reasons for this included 1) a lack of money to buy these items every day; 2) fruit, when bought, do not last long with all the children in the house; and 3) when they cook, it is mostly chicken, maize meal and potatoes, and sometimes spinach because that is how they grew up and that is what they have. The participants already knew what they should be doing, as they had heard a similar message from doctors and clinics and agreed that they were willing to try to follow it because they fear sickness. The EI participants felt that the communities need to understand the guideline and that families should be educated on the importance of fruit. Responses from the EF participants ranged from neither parent liking vegetables, but the children being encouraged and expected to eat them; to the guideline being applied in their home.

4.6.5. Barriers/enablers to implementation of the guideline

According to the responses mentioned above the biggest constraints to reaching the recommended vegetable intake were availability, affordability and taste preference. One major barrier mentioned by the formal participants, was a short shelf life of and lack of time to buy fresh fruits and vegetables weekly. Frozen vegetables were discussed as the answer to part of this issue. The participants in Atlantis stated that there are a lot of cheap, unpackaged fruit and vegetables available in this community, at the stands on every corner – providing them with the possibility to access these foods daily. None of the participants felt that the guideline needed to be changed or simplified.

4.7. 'Eat dry beans, split peas, lentils and soya regularly'

4.7.1. Previous exposure to similar guidelines

Previous exposure to the 'Eat dry beans, split peas, lentils and soya regularly' guideline varied between the participants. The clinic was a common source of information among XI, AF and EI participants. AF groups added that they had heard of this from their community centre and grandmothers. They also mentioned that children regularly ate these foods at the crèche. Some EI participants had heard of this guideline on the television and at health facilities while others stated that they had never heard of it before. Among the EF participants these foods were not commonly liked or regularly eaten by most. They were unfamiliar with the term 'dry beans.' They mentioned that they had not seen this guideline as portrayed here and that it is not a common statement. Legumes were described as possibly being unhealthy because they are *"starchy*." Other participants spoke about reading complementary feeding books, which suggested introducing their children to these foods as part of a paediatric feeding programme based on young child development, and thought it was healthy. Some mothers had been successful in introducing these foods to their children whereas other participants reported that their children had not enjoyed them at all.

4.7.2. Appropriateness of the guideline in terms of the mother's/caregiver's understanding and interpretation of the guideline

Among AF caregivers, 'regularly' was interpreted as *"now and then"; "once a day"; "once a week/month"; "enough"; "not every day"* or *"not so often"*. These participants also described 'regularly' as once per week and that these foods are easier to enjoy in winter (e.g. in 'stamp' i.e. dried corn kernels that have been stamped and chopped until broken but not as fine as Mealie-meal or mielie rice, soups or biryani, i.e. a spicy Indian rice dish) and that *"it does not sound right to have these foods in summer." FGD: AF2, P: 4 to Rohrs (2017).* Some EI participants felt that 'regularly' meant that these foods can be eaten *"every day."* EF

participants differentiated between 'plenty' and 'regularly' stating that regularly is less than plenty and meant 1-3 times a week, rather than daily.

4.7.3. Understanding and interpretation of the guideline with regards to the mother's/caregiver's socio-economic status, culture, home language and type of settlement

Responses regarding the importance of these food items ranged from "*It is important"; "…provides important proteins and minerals"* and *"similar to vegetables"* among the XI, AF and EI participants from Witsand, Atlantis and Du Noon groups to *"not as important as vegetables"* from the EF participants.

Among the AF participants, some clearly expressed their dislike for the taste of soya. Some uncertainty surfaced in the AF and EF discussions regarding 'dry beans' and what foods they can be cooked with - participants discussed the use of sugar beans and lentils in biryani amongst themselves. Responses to consumption of dry beans included that they were "*Just not tasty" FGD: AF4, P: 4 to Rohrs (2017)* and said that its *"gross" FGD: EF1, P: 1 to Rohrs (2017)*. Some of the EF participants explicitly stated that their children do not like these foods and questioned whether nuts and chickpeas or hummus fall into this category. There was further uncertainty among EF groups as to what food items are included in this guideline and *'whole-grains'* were mentioned whilst comparing the SA PFBDGs with a food pyramid that had featured in previous education.

EF responses were mixed, some saying that they do try to incorporate these food items, others stating: *"It's not something I would promote." FGD: EF2, P: 3 to Rohrs (2017).* Most of the EF participants agreed that these would not be their first choices of foods when cooking, but that they can be important, especially for vegetarians. One participant justified their lack of importance stating: *"Because mine is 4 years old and it's alive without that… And I wouldn't eat any of that…";* and *"…But if you do get vegetarians then that's their source of protein. So, I can understand why it's there, it's just not to me applicable." FGD: EF1, P: 1 to Rohrs (2017).* Some EF participants believed that these foods can be replaced by other protein-rich foods like nuts and biltong, which were deemed more culturally acceptable. It was agreed that legumes would fall under the protein group, and that these are preserved forms of protein that may be useful in emergency situations, i.e. *"Ja, preserved longer. So, that's where soya plays a, also I think, a healthy part, it's like a healthy group… but it's not like that important, a food group. So it's not something that I'll promote…" FGD: EF2, P: 3 to Rohrs (2017).* Most of the EF mothers felt that these foods cannot be that important because of the use of the term 'regularly' (compared to 'plenty'). One EF participant felt that these foods are important, saying: *"Well, it only says regularly, which means once a week, so it can't be that important…"*

FGD: EF2, P: 1 to Rohrs (2017); "But, I think it is important. Because, again, variety." FGD: EF2, P: 2 to Rohrs (2017). In contrast, EI participants felt that these foods are important because of the use of the term 'regularly' and because it was part of the SA PFBDGs.

AF participants' responses remained divided. Some agreed that it is a cheaper option that can be used to increase volume of protein dishes, especially when cooking for many people. The use of split peas in soups and lentils in biryani was mentioned. Others did not cook some of these foods in their homes due to lack of familiarity and their undesirable aftertaste (especially dry beans and soya). To some of the EF participants canned beans were the most familiar form of these foods, but no examples of meals containing them were offered.

4.7.4. Use of the guideline to plan meals on a daily basis

Afrikaans participants cooked lentils and beans, some more often than others. Other participants did not implement this guideline because they disliked beans and lentils altogether. Split peas were not included often and sometimes canned beans were preferred. One EF participant described her regular use of lentils for variety and to help the children to become adaptable (e.g. in a food crises or disasters in the future): *Yes, I think it's still important to have a variety because you don't know what your circumstances are gonna end up, you know, where you're gonna end up in life, and you may not be able to eat meat for whatever reason… and then you don't want your body to not be able to adapt to that, so, for variety…" FGD: EF2, P: 2 to Rohrs (2017).*

4.7.5. Barriers/enablers to implementation of the guideline

All groups considered these foods a less costly alternative to meat. Participants in the AF and EI groups felt that they could follow the guideline. Some of the EF participants explicitly refused to follow the guideline while others stated that one could if one wanted to. Generally, all groups assumed that the general public would understand the guideline. EF participants thought that the guideline was not applicable in their community and that the general public would question the guideline, even if they understood it. They felt that it is not really part of their culture, but more applicable to other communities.

None of the groups felt that the guideline was difficult to understand. Only the EF participants suggested that the wording could be changed to *"protein snacks"* which is what they interpreted the guideline to mean.

4.8. 'Consume milk, maas or yoghurt every day'

4.8.1. Previous exposure to similar guidelines

Dairy was a well-known food group. All participant groups were familiar with this guideline in various forms. The XI participants had all heard of a similar guideline before but not specifically that you should consume milk/dairy every day. Some had heard it at the clinic or even at the church and in the form of peer-advice to remove dust from your throat. One participant stated: *"It's not a must that you must eat all of them per day. You can maybe, today eat maas, perhaps tomorrow you eat yoghurt, a day after tomorrow you drink milk but as long you at least eat something dairy every day." FGD: XI: 4 P: 10 to Facilitator (2017).* AF participants mentioned having heard of this at the clinics, on television and from dentists. EI participants added that they had also heard it in hospitals, schools, on the radio and from their grandmothers. EF participants were aware of dairy guidelines and had heard similar information from a dietitian as well. It was mentioned that recently there had been information available (in well-known magazines), discouraging dairy intake. More sources of information mentioned here were medical aid companies, the food pyramid, television advertisements and parents.

4.8.2. Appropriateness of the guideline in terms of the mother's/caregiver's understanding and interpretation of the guideline

Some AF participants recognised 'maas' as thick/sour milk while others suggested skimmed milk or something similar like processed milk or 'maaskaas'– indicating some uncertainty regarding the word 'maas'. It was described as a *"isiXhosa/Zulu thing"* and recognised as the brand of the product called 'Amasi' which can be purchased in cartons/bottles. Some AF participants were familiar with yoghurt and milk but not maas and had never given maas to their children. The EI participants understood that milk, maas and yoghurt provide calcium for the children's bones. There was no confusion concerning these products. EF participants understood this guideline to mean that they should consume dairy every day, and as quite straightforward. The meaning of maas was clarified as 'thick/sour milk.' EF participants mentioned that they do not consume maas. One participant stated that maas is cheaper than milk in the *"African areas"* where it was believed to make you very strong and therefore consumed more regularly.

4.8.3. Understanding and interpretation of the guideline with regards to the mother's/caregiver's socio-economic status, culture, home language and type of settlement

XI and AF participants felt that it is important for young and old people to consume dairy daily. One XI participant said that it is necessary to give children yoghurt or maas: *"It's a must that you give the child maas and yoghurt because they don't have lots of fat." FGD: XI1, P: 2 to Facilitator (2017)*. It was also mentioned that you cannot give too much maas or only maas, because other foods are also necessary; *"…but somewhere somehow it's important to limit the child, just give the child a limit, if s/he ate maas from the morning till the evening, no. If a child ate maas now there must be something else you're going to give the child after eating that maas." FGD: XI2, P: 2 to Facilitator (2017).*

All other groups displayed similar levels of knowledge when it came to dairy products and felt that these foods were an important part of a child's diet. AF and EF groups described them as healthy protein sources and stated that calcium is good for your bones, and EI participants spoke about calcium, saying: *"I'm going to talk about the milk, it makes our small ones, their bones, it gives calcium, actually, for their bones." FGD: EI3, P: 3 to Rohrs (2017).* Dairy was considered important among the EF mothers due to being *"un-processed"* and *"nutritious"* and being important for bone development and providing proteins and probiotics.

4.8.4. Use of the guideline to plan meals on a daily basis

All participant groups consumed at least one of these food items regularly or weekly, if not daily. XI participants explained that they try to make sure their children get maas or yoghurt and that the children preferred maas and pap (known as *'African salad'*) over samp and beans. They also mentioned drinking milk and that the milk/maas is given with pap, as some children did not like the taste of these items alone. Maas was not given too often, due to resulting in the children not liking other foods anymore. AF participants confirmed that these items are available to them and indicated that the children might get these foods from their grandparents, implying that it is a treat. Some AF participants mentioned giving their children milk to drink in the mornings and evenings. They discussed that they usually packed a small yoghurt and a fruit for their children to take to crèche every day. Participants indicated that dairy product companies sometimes came to the crèches to give the children milk and teach them and their parents about the importance of dairy, that it is healthy and can be consumed daily. The EI participants indicated that they do consume these items daily. One response was: *"That is the food that we use in our homes. We eat maas, yoghurt and milk. We always have it in the fridge but we don't use it every day, sometimes, let me say, in a*

week then you have it twice but not every day, because you know mos, every time you open the fridge, the small ones, they say, 'Mommy there's a yogurt, give me!'" FGD: EI3, P: 3 to Rohrs (2017). Yoghurt and milk were also regularly consumed in the EF participants' homes, mainly by the children.

4.8.5. Barriers/enablers to implementation of the guideline

The consensus among groups was that they and the general public would be able to understand and follow this guideline. The Afrikaans participants suggested that everyone would understand 'Amasi'/'suurmelk'/'sour milk,' better than 'maas'. They believed that education is important, mentioning that some of the mothers in the community think that their children are allergic to maas, but still offered their children yoghurt. Besides the suggestion made by the AF participants that 'Amasi' might be better understood, all the participants were happy with the wording and agreed that these are familiar food items.

Affordability was mentioned as some study participants were not able to afford all these foods every day, but at least 1-2 times per week. Milk was used every day in different ways, but yoghurt was considered a special treat for some and was not always kept in the house. Further discussion revealed that small yoghurts are available for R2.00 each in some areas.

4.9. 'Feed your child regular small meals and healthy snacks'

4.9.1. Previous exposure to similar guidelines

All the XI groups had heard of the guideline, the main source of information being clinics. Participants had heard of the importance of not overfeeding and the importance of weighing children regularly to ensure adequate weight gain amongst other advice given. They mentioned not giving certain foods at certain times, e.g. yoghurt in the mornings, rather in the afternoons (this was mentioned in some AF groups later as well). Some AF participants had heard of the guideline. Additional sources included childcare books, clinic nurses and dietitians. Participants who mentioned dietitians had been referred due to their child being under-/overweight. Dietitians and the hospital had provided education about small, regular portions being healthier for children. The EI groups had heard about the guideline from schools and hospitals as well as clinics. The majority of the EF participants had heard of this guideline before. They had seen or heard it either in pamphlets, from doctors and medical specialists. They admitted not having seen it exactly as is here, but rather described as three main meals and three smaller meals throughout the day.

4.9.2. Appropriateness of the guideline in terms of the mother's/caregiver's understanding and interpretation of the guideline

XI mothers demonstrated their understanding of differences between meals and snacks, explaining that a meal must be given and then a snack can follow a bit later, stating that *"they can eat chips, but food is needed as well…" FGD: XI4, P: 10 to Facilitator (2017).* There was also discussion about not giving children the same food all the time and not just 'adult food.' Understanding of 'healthy snacks' was clear, participants agreed that chips are not healthy. One participant stated a belief that eating chips could result in ringworm.

AF participants seemed to understand the guideline well and talked about healthy snacks and giving 3-4 meals a day. Even eating eight times a day was considered normal, depending on when the child woke up and how much they managed to eat at once. Some interpreted 'regularly' to mean every day and did not specify how many times a day, but as the discussion continued, meals and snacks throughout the day were described in more detail. Healthy snacks were considered to be a piece of fresh fruit, dried fruit, yoghurt or a slice of bread with peanut butter, viennas (processed meat sausages), peanuts, carrots or raw potato. From the guideline, it was understood that children should have lots of small things to eat throughout the day or that this would normally mean three meals (breakfast, lunch and supper) plus one or two snacks in between every day. The Afrikaans word for "snacks" ('peuselkos') was unclear to some, although participants showed understanding that this meant 'snacks' and *"something in between", "not a proper meal."* One suggestion was made to change the wording to *'snoepgoed'* instead.

There was consensus that small meals should be given according to the child's age, perhaps every two to three hours. One EI participant explained 'small meals' and 'regularly' by saying: *"yes every day, but, after three hours… must skip the two or three hours and then you give again and then after two hours or three hours you give again, a small amount. You don't give a child a slice of bread, a full slice of bread like this. You must cut it in smallest amount so that he can be able to take it, a piece and eat, you see? Don't give the full slice or three slices… you must cut a triangle, a square..." FGD: EI3, P: 1 to Rohrs (2017).* They expressed a need for education to know what foods can be given as small meals or snacks. One participant also said: *"Don't make a plate full for one time and then you go, that child is gonna get bored. It's gonna leave that food like that, you see? You gonna cut it, cut it… nice slices." FGD: EI3, P: 1 to Rohrs (2017).* Healthy snacks were considered to be little bits of food throughout the day and foods like fruits, yoghurt and bread with cheese, polony (i.e. processed meat sausages often made from blend of pork beef) or eggs and juice.

The EF group's interpretation of the guideline was similar to the other groups, i.e. 'regular small meals' meant at least a few times a day or every two hours and healthy snacks were foods like nuts, fruit, biltong,

Provitas (i.e. whole-wheat crisp bread) white cheeses and yoghurt and *"nothing processed"* (not chocolate and chips). According to some participants, 'small meals' were considered just an apple or a banana, or a snack that was the size of your palm. Some EF participants were a bit sceptical of the use of the word 'meals' and that multiple meals throughout the day would provide too much food. It was suggested that the wording could be altered slightly rather to *"three meals and healthy snacks."*

4.9.3. Understanding and interpretation of the guideline with regards to the mother's/caregiver's socio-economic status, culture, home language and type of settlement

AF participants felt that it is important to give children small portions regularly instead of big portions at one time. XI participants agreed, saying that *"the child's intestines are still small." FGD: XI2, P: 2 to Facilitator (2017).* AF participants believed that eating too much at once must be unhealthy. EF participants considered the guideline to be important and felt that it helps to ensure that their child eats something when they are hungry and to make sure that they are eating nutritious foods and forming healthy habits.

4.9.4. Use of the guideline to plan meals on a daily basis

XI caregivers admitted to giving children small bits of food at a time but also that they would give more as the child desires. AF, EI and EF participants all agreed that the guideline is easy to follow and even that it states what they are already doing at home. Further opinions included changing the wording slightly to help the general public to understand that meals are bigger than snacks, so as not to give too much food throughout the day.

4.9.5. Barriers/enablers to implementation of the guideline

Responses revealed that participants believed that the general South African public would understand it but would not follow it as healthy snacks are not always available, as fifty-cent chips and bread are the most available and affordable snacks. Otherwise, the majority of the participants would leave the wording as is and confirmed it as appropriate.

4.10. 'Use salt and foods high in salt sparingly'

4.10.1. Previous exposure to similar guidelines

AF and EF groups were aware of this guideline and had come across it on the television or the radio, in crèche's, clinics or hospitals and from doctors or dietitians. The EF participants also mentioned having read this in child nutrition books. XI and AF groups associated the guideline with high blood pressure and diabetes as this was how they had learnt about reducing salt consumption, from chronically ill acquaintances. XI participants indicated having heard this guideline before and knowing that too much salt can damage your liver. They also described having seen recommendations for limiting salt intake specifically for children. One of the EF participants said that they had not heard of this before.

4.10.2. Appropriateness of the guideline in terms of the mother's/caregiver's understanding and interpretation of the guideline

XI participants were somewhat confused about this guideline - they expressed awareness of the concerns around high salt consumption but stated: *"It sounds as if this sentence wants you to add more salt when cooking" FGD: XI4, P: 3 to Facilitator (2017).* The XI participants generally felt that food with a lot of added salt is *"not right"* for adults or children, and AF participants agreed that one should always use salt in moderation. EI participants showed their understanding of 'foods high in salt' mentioning foods such as biltong, salted fish, sausages, chips and similar snacks. EI participants were uncertain of the meaning of the word 'sparingly' but described salty foods as *"damaging to your body" FGD: EI3, P: 3 to Rohrs (2017).*

Not all AF and EF participants were entirely certain what the phrase 'foods high in salt' meant, explaining that they needed a bit more information on what types of foods these are. They did mention salty and oily or snack-type foods including soya mince, salted peanuts, popcorn, salted fish, cheese, sauces, and instant mix packs (e.g. bolognaise), some seasonings and mushrooms as being high salt foods. EF participants concluded that the guideline pertained to foods that *"just have a high salt content."* It was considered important to teach children the taste of food, not salt, and that too much salt can lead to high blood pressure, cholesterol and heart conditions later in life. *"Ja, in the kids cooking meal books and stuff that I used as I was weaning them off milk and stuff… there was never salt even added with preparation of their vegetables, anything, it was always either steamed up or quickly boiled up and then pureed…" FGD: EF1, P: 1 to Rohrs (2017)* and *"Ja, when you start weaning, your, the kids they say; leave out salt, you can only put spices." FGD: EF2, P1 to Rohrs (2017).* 'Sparingly' was understood as *"only when necessary"; "very little"*; *"in between" or "only a teaspoon or less."*

4.10.3. Understanding and interpretation of the guideline with regards to the mother's/caregiver's socio-economic status, culture, home language and type of settlement

XI participants affirmed that too much salt is not healthy and can affect your blood pressure. They admitted salt (and sugar) improves the taste of foods. *"Yes… because food with no salt it's tasteless. It's not really about salt you can also use other things except salt. You can add salt but a pinch of it. Put a pinch of salt in food, put whatever you're putting, something that will make food tasty." FGD XI2, P: 2 to Facilitator (2017).* AF participants believed that this guideline is important for helping to prevent diseases and because they have seen how it affects people when they get older (e.g. high blood pressure). EI participants believed that it is important to limit your salt intake and spoke about too much salt increasing thirst and raising your blood pressure and supported the importance of monitoring salt intake. Opinions among the EF participants were not unanimous; on the one hand was the case against salt, saying it makes you thirsty and causes water retention; while on the other hand one participant did not think it was that bad for you, that it prevents cramps and therefore, they use a lot of salt. Suggestions for salt substitutes were offered (e.g. bananas can help to prevent cramps and herbs or spices for cooking). Some EF participants agreed that salt is not nutritious or necessary and that excess salt can lead to health issues in the long term.

4.10.4. Use the guideline to plan meals on a daily basis

XI participants admitted to using salt when cooking and believed it is better if the salt has been cooked. The AF participants also mentioned that they do not like *"raw salt"*, saying that the food would be *"too fresh."* Some XI participants described lowering the amount of salt used in cooking for those with high blood pressure and others described adding salt purely according to taste. There were AF participants who liked the taste of salt and confessed using more than they probably should. All AF participants used salt during cooking but claimed to not add more at the table. They talked about teaching their children that adding more salt is unhealthy and tried not to give their children foods high in salt, but that they themselves enjoyed salty foods. They explained that some people have learned to put salt on fruit which they thought was an unhealthy habit. EI participants agreed that it is important to limit salt consumption. Most of the EF participants claimed to use salt sparingly.

4.10.5. Barriers/enablers to implementation of the guideline

The majority of all the participants felt that they would be able to follow the guideline, despite some confusion around the word sparingly and taste preference, which was a significant barrier. Among EF

mothers, one participant stated not being able to follow the guideline because of her love of salt. XI and AF groups did not see a need to change the guideline at all. EF participants were somewhat confused by the wording 'foods high in salt', questioning whether this meant added salt or natural salt. Suggestions by AF and EF groups to simplify the guideline included rather saying *"foods with salt"/"foods that have salt,"* respectively. EI participants, however, felt that the guideline was fine given that some background education is provided with it.

4.11. 'Use fats sparingly, choose vegetable oils rather than hard fats'

4.11.1. Previous exposure to similar guidelines

All participants had heard of this guideline before. XI participants indicated that they were aware of the guideline, saying one should not use too much oil and that *"olive oil is the right one." FGD: XI2, P: 2 to facilitator (2017). "When cooking meat at least just put water and meat has its own fat then you can fry it with its fat. They call it 'natural fat.'" FGD: XI4, P: 10 to Facilitator (2017).* Some AF participants mentioned having heard about fat from doctors and had seen on television that they should use olive oil. They mentioned that the crèches and clinic nurses advise parents to put some oil in a child's porridge to help them gain weight when necessary, but that was not 'vegetable oil' to them. EI participants had heard that they should not use a lot of fat and not to put oil on food after it is cooked, but that it is better to cook the oil. There was confusion about the word 'sparingly' again (as with salt). These participants had heard of alternative, low fat cooking methods from doctors and clinic nurses. EF participants had heard of this from school, child nutrition books and magazines. They also mentioned low-carbohydrate high-fat diets as being the opposite of this. The term 'hard fats' was unfamiliar to them.

4.11.2. Appropriateness of the guideline in terms of the mother's/caregiver's understanding and interpretation of the guideline

Participants were puzzled by this classification of fats. AF participants were unsure of which oils were classified as 'vegetable oils' suggesting that they probably contain less fat than *"normal"* oils. They debated if it was olive oil or sunflower oil, admitting that they check the price rather than the type when buying oil, even if 'vegetable oils' meant there are certain oils that are healthier than others. Participants described 'hard fats' as rendered animal fat from meat that is left to harden and then used again (e.g. to spread on bread or for cooking) and as pork fat that has been removed from the meat. They did not associate 'hard fats' with butter but explained that butter was something they use very sparingly. When probed, they agreed that butter was a hard fat and, in fact, refers to anything that has 'set' and is not in liquid form. They felt it unnecessary to use any oil for cooking bacon. Coconut oil was offered as an example of 'hard fat',

although participants remained uncertain of what 'hard fats' meant but assumed that rendered animal fat is less healthy than oil.

EI participants classified sunflower oil and olive oil as 'vegetable oils' and thought it contained less cholesterol than other oils. They mentioned a brand *"Holsum"* which they described as being animal fat mixed with oil, similar to Rama (soft margarine available in a block or tub), which was classified as a hard fat. EI participants believed it is important to limit fat consumption to prevent obesity and illness.

EF participants demonstrated more detailed knowledge compared with the other groups by explaining the need for essential fatty acids and differentiating healthy and unhealthy fats. Participants believed that fats should not be cut out of the diet, but rather used in moderation, when necessary and as part of a balanced diet. They were more focused on using *"natural fats"* (e.g. plant fat, avocados, coconut oil or even fat on meat or poultry) and less *"processed/plastic"* fats (giving margarine as the example). They felt that fats are a necessary component of the diet and should not be especially limited, saying *"…because natural fat is good for you. So, if you are using the correct fats, you don't need to use them sparingly, you can just use them as your meal needs it." FGD: EF1, P: 1 to Rohrs (2017)*; and *"I've also been told, fat makes fat, which is not true but, you get the unhealthy fat groups, then you get healthy fat groups, which is your omegas, which we do need in our bodies… when we put it in the right way, because you need to eat it, you can't cut it out, but you need just a little amount, so that you don't need huge amounts, to be healthier…" FGD: EF2, P: 3 to Rohrs (2017).* They mentioned that the word 'sparingly' conveyed to them that they should try to avoid fats and that they are bad for you, with which they disagreed. Other participants' interpretations of 'sparingly' were *"hardly ever"* or *"only 1 teaspoon, not a cup full."* Overall, EF participants agreed that fats are necessary and important for children in providing energy as well as lubrication for joints. Macadamia, olive, coconut, sunflower and canola oils were mentioned when asked about vegetable oils. Butter was the first hard fat mentioned and avocado and lard were also classified as hard fats.

4.11.3. Understanding and interpretation of the guideline with regards to the mother's/caregiver's socio-economic status, culture, home language and type of settlement

Participants generally all felt that a guideline on fat was important. XI participants discussed oils and concluded that they use sunflower oil because it is cheaper and that they used oil sparingly, in their opinion. *"Yes, it's important, but not putting too much, even if it's just a spoon it's tasty."* It was also mentioned that *"there are things that need oil; there are things that don't need oil when you're cooking." FGD: XI2, P: 2 to Facilitator (2017).* EI participants stated that they like to taste the fat. Therefore, it was

described as difficult to follow this guideline because it is a part of their culture and they want to eat the fats, particularly the animal fats. *"…if there is no fat, that plate is lousy… the plate is not right, you see. Your food is not right. Must be, must be a fat." FGD: EI3, P: 4 to Rohrs (2017)* and sunflower oil was described as *"weak."* EF participants mentioned that they include fats in their diet and try as much as possible to use the more natural options available (e.g. butter instead of margarine). They also admitted enjoying fats and fried foods occasionally. One EF participant said: *"I cook with butter, like quite… vegetables are lathered in butter, my chickens lathered in butter…" FGD: EF1, P: 2 to Rohrs (2017)* thinking that maybe it's an *"Afrikaans thing."*

4.11.4. Use of the guideline to plan meals on a daily basis

One XI participant indicated that she taught her family not to use too much oil and checks up on this when someone is cooking. AF participants said they generally use sunflower oil, referred to as "fish oil," a term possibly originating from frying fish (a favourite Cape Town dish) in sunflower oil, as they cannot afford the expensive one (i.e. olive oil). They felt that olive oil was the healthiest oil you can use with any foods. It was believed that it is important to limit oils and fats because it can be unhealthy. Participants said that they try to use fat sparingly but do not always do so as it is tasty. AF participants believed that it is an easy-to-follow guideline and healthy to do so, despite not following it consistently mainly due to the favourable taste of fats.

4.11.5. Barriers/enablers to implementation of the guideline

According to FGDs, common barriers were taste preference, cultural norms and cost of healthier fats. One XI participant felt that even though it is delicious, you should not eat too much oily food. Another participant felt particularly concerned about educating people about not using too much oil, saying that oil that has not been cooked is more harmful, similar to uncooked salt discussed earlier.

AF participants felt that the guideline is implementable and that it is possible to follow it in their environment. The main reasons for not following the guideline were traditional cooking methods, taste preference and that take-aways (eaten regularly) are very oily. EI participants said that they could try to follow it, but it is not what they are used to, making it very difficult for them. EF participants kept to their opinions that it is not quite right to use the word 'sparingly', as fats are an important part of the diet, as mentioned earlier, but did mention that they used fat only as they deem necessary. They felt that the general understanding of this guideline would depend on the areas where people lived and grew up, but also pointed out that people generally try to be more health conscious these days. They were uncertain of

the wording and explained that the guideline was a bit ambiguous to them by stating that fats should be used, but sparingly (previous;ly interpreted as *"avoided"* or *"as little as possible"* with the salt guideline).
AF and EF participants suggested some changes to the wording in efforts to clarify the guideline. AF participants were unhappy with the term 'vegetable oils' as they were uncertain of what this included, suggesting *"sonnebloem olie / sunflower oil"* or *"vis-olie / fish oil"* instead which was their understanding of vegetable oils. When the difference was explained to them as oils from plants and fats from animals they had a better understanding of the concept 'vegetable oils'. Participants in this group also felt that 'hard fats' would be misinterpreted and that additional education would be necessary. Participants went on to discuss that it would not be easy as some people want to be helped but some do not want to hear that they need to use less oil/fats. Some EF participants felt that the guideline should be changed, removing the focus from 'sparingly' and rather considering types or quality of fats. Others felt that the guideline did not need to be changed.

4.12. 'Use sugar and food and drinks high in sugar sparingly'

4.12.1. Previous exposure to similar guidelines

Most of the participants across all groups had heard of this guideline. Few had not but also displayed knowledge about the role of sugar in health, i.e. that it can cause obesity, and immediately associated this guideline with diabetes. XI participants had heard that consuming too much sugar causes diabetes and that you should monitor the amount of sugar you use. AF participants were aware of the high sugar content of carbonated cool drinks but said that they had never heard of this guideline. They had heard from their diabetic friends, family or acquaintances who were trying to lose weight, that sugar consumption should be reduced because too much can be unhealthy. Some had heard similar information from the clinic or the hospital. Other participants mentioned having been told that "Coke" (a carbonated sugar sweetened beverage) is not healthy and to look for sugar-free (artificially sweetened) alternatives. EI participants had heard of this from the clinic, radio, television or read it in magazines. EF participants had seen this on television and *"everywhere."* They stated that sugar was *"poison"* and bad for you, which was what they had read and heard from society and dietitians. The participants mentioned low-carbohydrate high-fat diets again and various sugar documentaries that they had seen.

4.12.2. Appropriateness of the guideline in terms of the mother's/caregiver's understanding and interpretation of the guideline

The general understanding of the guideline among participants was that sugar is not healthy. Three out of the four groups (AF, EF and EI) agreed that sugar should be used as little as possible or avoided and that

water is a better beverage choice than cool drink (juices or carbonated beverages, i.e. SSBs). XI responses revealed that sugar is *"not good"* and that they should use measured amounts but also that they like to add sugar to some foods, e.g. carrots, butternut and porridge. Among the XI participants, 'sparingly' was interpreted as *"saving."* One participant stated: *"No. If it already has sugar, just use that natural sweetness rather than putting more,"* but also added: *"Yes carrots, it has its flavour already but again we put more sugar, and in butternut." FGD: XI4, P: 10 to Facilitator (2017)*.

AF participants listed fast foods, sweetened and carbonated cool drinks, doughnuts, spaghetti, baked beans, sweetcorn, biscuits, chocolates and sweets (which they referred to as *"luxuries"* and *not "food"*) as high sugar foods that they consume on a regular basis. They mentioned that if you can you should avoid high sugar and tartrazine-containing carbonated cool drinks and rather choose sugar-free carbonated cool drinks. Participants also discussed foods like curry and butter chicken, describing these meals as rich and suggesting that they use sugar in these dishes which they feel is unhealthy. AF participants explained their understanding that they can use sugar in moderation, only up to a certain amount and that they should not *"overdo it."* They spoke about drinking water sometimes too - not always sweetened and carbonated cool drinks or juice. Participants emphasised that it is important, especially for diabetics, to minimise sugar consumption. However, they also mentioned that those of them who are still healthy (i.e. not diabetic) will drink more sweetened and carbonated cool drinks because they like the taste and it is a habit for some of them to drink up to 2L per day.

EI participants considered 'food and drinks high in sugar' to be cool drinks (SSBs), sweets and cakes but also mentioned tea and coffee, seemingly unaware that they are in control of the amount of sugar added. EF participants classified high sugar items as anything with added sugar (including cool drinks, spices and sauces). *"Whether it be the concentrated juices, because they all have sugar in, you're better off giving your child concentrated fruit juice diluted with water than Coke. With all the extra added nonsense in…" FGD: EF1, P: 1 to Rohrs (2017).* These participants were unsettled by how the guideline started with 'use sugar…' and said that they had never seen a guideline telling them 'to use' sugar. The guideline was compared to other approaches, like questions that they had heard, rather asking 'how often do you use sugar?' which was accepted as a better way to address sugar consumption by this group.

4.12.3. Understanding and interpretation of the guideline with regards to the mother's/caregiver's socio-economic status, culture, home language and type of settlement

Most of the participants already mentioned some of the unhealthy effects of sugar and expressed their feelings about the importance of monitoring sugar consumption. One XI participant proudly stated that their child has *"no problem eating foods without sugar." FGD: XI2, P: 5 to Facilitator (2017).* AF participants believed that this guideline is important because they believed that sugar makes children hyper-active. All participants in this group fully agreed that the guideline is very important because they have seen what happens to people with diabetes. One of the participants pointed out that fatty foods can also cause diabetes, not only sugar. EI participants attributed certain advantages to sugar, i.e. energy. They believed that you can have sugar but that too much sugar can cause worms, dental problems and chronic illnesses. EF participants felt that it is a very important guideline because they believed that sugar is addictive: *"Because sugar, to me, it's a very addictive product… which gets added into a lot of easy, junk type of foods and snacks, and its, it's empty, it's empty energy…" FGD: EF1, P: 1 to Rohrs (2017)* to which others agreed. They discussed having seen the effects on their children, describing the energy highs and lows that follow sugar consumption. There was a consensus that it is not good for their children like fruit and vegetables are. These participants also felt that the guideline is very important and described sugar as an unnecessary luxury and having no nutritional value. It was also pointed out that there are enough natural sugars to be enjoyed.

4.12.4. Use of the guideline to plan meals on a daily basis

XI participants spoke about measuring the amount of fruit juice concentrate used to make sure that it is not made too sweet. They also mentioned using sugar in their food (e.g. with some vegetables and porridge) but just one or two teaspoons. AF participants stated that they sometimes follow the guideline, but not always. They admitted that they love to give their children cool drinks (SSBs), even though they know it is not good for them. They were aware of the negative effects of sugar consumption, despite continuing to consume high amounts. One participant stated: *"We can do it, but we do not do it, yes." FGD: AF2, P: 4 to Rohrs (2017)*. EI participants' first response to this guideline was that it is difficult to follow. EI group responses to the question of implementing this guideline were divided between agreeing and disagreeing whether it could be done. One participant stated that it is difficult to implement, *"because our kids, they like sweets too much, the moment you give them money, they run to the shop and go buy a lot of sweets. And then they are maybe five years and they get sugar and they start to taste it, 'uh-uh mommy I don't like, put more', again, you see." FGD: EI3, P: 3 to Rohrs (2017)*. EF participants expressed the strongest

commitment to limiting sugar intake, but also admitted not always being successful. They believed that they could use sugar even more sparingly in their homes.

4.12.5. Barriers/enablers to implementation of the guideline

The majority of the participants felt that they could try to follow this guideline. XI participants were willing to measure sugar intake but mentioned that it would be difficult to constantly police the children, saying *"No, you can't. You'd act as a security for your entire life. You can't manage it, but they are being told." FGD: XI4, P: 10 to Facilitator (2017).* AF participants felt that they could follow it and that the guideline is important, although it was still clear that they enjoy sugar sweetened food and drinks because they like the taste. The AF and EI participants thought the general public would understand, but that examples of high sugar-containing food items should be provided and that the public would need to be educated regarding this guideline. EF participants described themselves as able to follow the guideline. They voiced their concern about the way the guideline starts with 'use sugar…' and they suggested that the guideline should have a more discouraging stance about using sugar at all, for example, rather to start with *"if you use sugar…"* They mentioned that if their 4-year-old children were to read this they would think that they had to be given sugar.

4.13. 'Drink lots of clean, safe water and make it your beverage of choice'

4.13.1. Previous exposure to similar guidelines

All participants in the XI groups had heard of the guideline and the importance of drinking clean and safe water. Some reported hearing this message in the hospital. One response was: *"At home we buy water for drinking; we use tap water for cooking, bathing" FGD: XI1, P: 1 to Facilitator (2017)* and another participant mentioned that: *"At school they're always telling us that you need to drink eight glasses of water per day, so I think it's important to us to drink as much." FGD: XI4, P: 3 to Facilitator (2017).* AF groups had all heard of the guideline and risks of not consuming enough water, such as dehydration, from schools, their mothers, magazines, hospitals and clinics, and *"everywhere."* They mentioned that drinking water is healthy and that they do this already at home. They were aware that you can buy clean water to drink. All EI participants had heard of the guideline either via television, radio, pamphlets, doctors, clinics and crèches. All EF participants were aware of the guideline despite not having seen it as it is portrayed here. They had heard of it from their mothers, doctors, beauticians and schools.

4.13.2. Appropriateness of the guideline in terms of the mother's/caregiver's understanding and interpretation of the guideline

Among the XI groups there was a good understanding of the importance of boiling or buying water to make sure it is safe to drink. One participant firmly stated: *"It's like you boil water if you want your child to drink it." FGD: XI1, P: 12 to Facilitator (2017).* 'Lots' was generally understood as *"eight glasses a day", "regularly"; "two litres of water per day", "a huge amount of water"* and *"a lot, too much…"* among EI and AF participants. These participants explained that boiled, cooled water that has been kept covered, purified, and *"processed"* or *"treated"* water was safe to drink. AF participants acknowledged that they do not usually drink eight glasses because they are too busy and therefore tried to commit to drinking *"as much as possible."* To the EF participants 'lots' meant that you should drink water if you are thirsty, up to eight glasses/two litres a day but one participant said: *"Ja, I won't personally put a value to it, because people can misinterpret, because you can, there is a thing as drinking too much water in some circumstances…"FGD: EF2 P: 2 to Rohrs (2017).* City of Cape Town tap water was viewed as safe to drink, but this was not considered true for the peri-urban, informal areas. Participants stated that: *" 'Clean and safe' probably just means don't go drink out of a water stream that's coming down here… we would assume the water coming out of our taps is safe…" FGD: EF2, P: 1 to Rohrs (2017)* and *"…safe water is either where it's in a city with a good water rating or from a supplier with good, clean water…" FGD: EF1, P: 1 to Rohrs (2017).* Water that had been bought from a *"water purifying place"* was also considered safe. Concerns regarding drought weather conditions being experienced in the Western Cape Province at the time were mentioned.

4.13.3. Understanding and interpretation of the guideline with regards to the mother's/caregiver's socio-economic status, culture, home language and type of settlement

XI participants agreed that boiled water, bought water or water left overnight with 'Jik' (strong cleaning bleach containing calcium hypochlorite) was safe water. Some participants were unsure about the safety of this practice and the amount of Jik that should be used. One participant explained: *"For example, in my area people are still fetching water, people in the rural areas don't have toilets, and people make use of the open spaces, so when it's raining that dirt descends to the river. So there are people who are educating people about the fact that water must be boiled then put a little bit of Jik. Many people suffered… and were hospitalised because of water." FGD: XI1, P: 1 to Facilitator (2017).* Drinking water was described as *"being done since the beginning of time"* by one EF participant, who also said: *"It just flushes you out… When you're sick, you drink water, it just cleans you out…" FGD: EF1, P: 2 to Rohrs (2017)*. All study participants

thought that drinking water was considered important for various reasons including for the kidneys, to cleanse the bladder and to prevent diarrhoea and dehydration. They all agreed that this guideline is important for children.

4.13.4. Use of the guideline to plan meals on a daily basis

All participants agreed that they would be able to follow this guideline. The XI groups mentioned that they try to remind the children to drink water, but they forget sometimes. They spoke about children not liking water unless they are very thirsty, e.g. *"Kids drink water when they're forced to… you would hear the child saying 'mama please give me some water' then you would realise that the child has eaten something that made her or him thirsty. If you just give the child water just for fun that child wouldn't drink it but water is important." FGD: XI4, P: 3 to Facilitator (2017).* Some participants believed that they can follow this guideline and that the general South African public can follow this because they are aware of it and know it is healthy. Some AF participants said they do drink water at home and prefer it, while others prefer to drink coffee and cool drinks (SSBs) when they were thirsty. EI participants reported drinking water at home and mentioned no problems with following the guideline for themselves or the general public. They were satisfied with the wording of the guideline.

All EF participants indicated that they drink water at home but the discussions revealed difficulties in getting children to drink water as they do not all enjoy it. Participants spoke about the unappealing taste of water and adding flavours (e.g. lemon cordial or fresh fruits and herbs) to it to improve the taste. They also explained that it is easier to drink more water in summer than in winter: *"like with my daughter, if she, especially summer, she drinks loads of water, but in winter, often you get her water bottle back from school and it's just a sip, so I think winter is tougher for most people to drink water because of, it's just cold and you want something warm and comforting… and you want the sweet stuff, even kids want the sweet, comforting stuff..." FGD: EF2, P: 2 to Rohrs (2017).* Socialising was associated with having cool drinks instead of water. However, all EF participants confirmed that they would be able to follow the guideline and felt that the general public would too. One suggestion to change the wording to 'drink eight glasses of water a day' was made with the idea of keeping it short and sweet. One participant stressed that children need visual quantities, despite earlier concerns of not putting a specific value to it to avoid overconsumption of water. It was also suggested that 'make it your beverage of choice' could be left out, explaining that they will not be inclined to choose to drink water when they themselves go out, for example.

4.13.5. Barriers/enablers to implementation of the guideline

XI participants mentioned a few barriers including children not liking water and dirty tap water: *"Sometimes there wouldn't be water, they would be cleaning it then when it's back it would be dirty and you wouldn't know what's happening, also not sure whether they're cleaning it or not but we don't have a choice, we use the tap water for drinking." FGD: XI4, P: 10 to Facilitator (2017).* They confirmed that the guideline is understandable, and the wording need not be changed. The AF participants mentioned incidences of non-payment or incorrect issuing of water bills and water being turned off. Thus, they stated that they can follow it, if the water bill is not too high and water is available. There were no objections to the wording of this guideline.

4.14. 'Be active'

4.14.1. Previous exposure to similar guidelines

All study participants had heard of this guideline before and it was described as *"general knowledge."* XI participants believed that not exercising can lead to weight gain and a tired body. They also explained that being active improves your blood circulation and helps to prevent diseases. AF participants felt that everyone is active every day, *"busy doing things."* They mentioned having heard and seen this on television and in magazine advertisements. EI participants had also heard of it at school and at church. EF mothers mentioned gyms and schools as sources of this information, medical aid companies and doctors also providing information on being active. They stated that they had been taught to be physically active from a young age.

4.14.2. Appropriateness of the guideline in terms of the mother's/caregiver's understanding and interpretation of the guideline

Being active was described as being fit, walking or jogging regularly, moving your muscles, and for children; letting them be active and not just allowing them to sit in front of the television. AF and EF participants described it as not being lazy, participating in outdoor activities, playing, *"being a kid"* and getting the heart rate up. XI participants believed that if you are working you are active, even though you might not be doing exercise as such.

4.14.3. Understanding and interpretation of the guideline with regards to the mother's/caregiver's socio-economic status, culture, home language and type of settlement

AF participants felt it is important for children to be active, explaining that they learn physically through playing and they learn how to socialise this way. They described it as important to help children to be more alert. EI participants too, felt that it is important for children and one participant pointed out that: *"it's easy to see when your child is sick because, always, they are active. Small children, they are always having that energy to be active, they are very strong and then it's easy to see them, when they are sick." FGD: EI3, P: 3 to Rohrs (2017).* EF participants agreed that it is very important for children to be active for their muscle, gross and fine motor and overall development. They explained that it is good for their physical and mental wellbeing. They felt that it was an important thing for children to learn from a young age and to form healthy habits for life.

Participants demonstrated their understanding of benefits of keeping active for adults as well. XI participants described that it is important to do exercise and to move your body after meals, as opposed to just sitting around. XI and EI participants described exercise as anything that requires you to move, including household chores. AF participants stated that being active is good for your heart and that the more active you are the more energy you have. EI participants also believed exercise is important for keeping their circulatory system and their bodies healthy.

4.14.4. Use of the guideline to plan meals on a daily basis

All participants acknowledged that their children are very active. XI participants confessed that their families will often just eat and go to bed, while others stated that their families are very active, especially the children. Regarding everyday implementation of this guideline among mothers/caregivers themselves as adults, responses varied among different language groups and areas. Some of the AF participants said that they are active and walk a lot throughout the day, while others described not being very active (other than some walking). These mothers/caregivers classified their work and doing housework at home as active, stating that they do not have time for exercising as well. Some of the EI participants said that they are not always so active while others thought they were. They mentioned that they sometimes feel lazy due to stress. EF participants felt that they do try to be active themselves but are not as active as their children.

4.14.5. Barriers/enablers to implementation of the guideline

Participants felt that that they were able to understand the guideline and that the children could definitely follow it. Although the general feeling among all participants was that exercise is important and plays a role in one's health and wellbeing, one major barrier to the mothers/caregivers themselves being active, was not having time to exercise and being busy with daily life and caring for their children. EI groups felt that they could try to follow it because they believed it is important to keep their weight within normal range and prevent chronic illnesses, but that it is not the norm in their culture or community to go jogging, for example. AF participants concluded that the general public's ability to follow this would depend on how busy they are. Most participants felt that the guideline did not need to be altered. Some of the AF participants thought that the guideline could maybe provide a little more information on what 'active' entails, for them as adults to implement it.

4.15. 'Hands should be washed with soap and clean water before preparing or eating food'

4.15.1. Previous exposure to similar guidelines

All participants were familiar with the message. There was general agreement as one XI participant explained: *"Yes, after going to the toilet, you must first wash hands before eating or before even holding a pan, there are germs. When you open a bin... Even if you're cleaning the bin, afterwards you must go to the toilet, open a tap, take soap and wash your hands. If you just hold a mug before washing hands, germs would get in your mouth. They show us on TV that it's important…"* FGD: XI2, P: 4 to Facilitator (2017).

AF groups named clinics, crèches, schools, restaurant bathrooms and parents as previous sources of this information. Participants mentioned that this is everywhere around them and that hands should always be washed with soap and water, taking care to ensure that the soap is thoroughly washed off again. They explained the danger of germs, explaining that they had been taught to always wash their hands before eating. The EI participants had heard this from similar sources and taught it to others. They mentioned posters in public places and some home-based caring courses which they had attended. The EF participants had heard it from their parents, television, government campaigns and educational programs at crèches.

4.15.2. Appropriateness of the guideline in terms of the mother's/caregiver's understanding and interpretation of the guideline

The XI and EI participants clearly understood the guideline. They explained that when many children need to wash their hands, water in the basin should be refreshed each time - they cannot all use the same basin of water because it is not clean. AF and EI participants considered running tap water as safe for hand washing without having to be boiled first. Stagnant water was considered unsafe for hand washing. Among the EF participants, tap water was once again discussed as being safe because of being supplied by the City of Cape Town and being treated by the time it reaches them - except when there are blocked water pipes due to flooding, making the water unsafe during these intervals.

4.15.3. Understanding and interpretation of the guideline with regards to the mother's/caregiver's socio-economic status, culture, home language and type of settlement

The general view on the importance of washing hands to prevent the spread of germs was repeated in all groups. The concern of becoming fatally ill from germs ending up in the food was voiced as well. XI participants stressed the importance of children washing their hands, especially before eating and preparing food, as they are always playing outside and exposed to germs that can increase the risk of disease, especially in the rural areas. AF participants discussed the necessity of washing your hands after playing and coming from the shops or the toilet. EI participants all admitted to already practicing this guideline at home. EF participants explained why it is very important for children to wash their hands often to remove dirt and germs, especially since children *"touch everything"* and their hands get dirty.

4.15.4. Use of the guideline to plan meals on a daily basis

All participants declared that they wash their hands regularly, and make sure that their children do too. Discussions were very similar regarding washing hands after going to the toilet and after playing, before preparing food or even holding cooking and eating utensils and always before eating. AF participants offered one example of an exception by explaining a scenario when a child does not always wash their hands before a quick snack while they are playing outside. Participants confirmed that they can and do follow this guideline. They mentioned that the general public is well aware of it, with some areas having received education from the clinics after having experienced high rates of diarrhoea in the past. No objections to the wording and no misunderstandings of the wording were mentioned.

4.15.5. Barriers/enablers to implementation of the guideline

Participants confirmed that they were all able to follow the guideline along with the general public, stating that everyone learns this from a young age, at home and in pre-primary schools. The wording used was described as "*perfectly clear"* and *"plain and simple",* and no alterations were suggested. No changes were recommended. Structural water and sanitation issues were noted.

4.16. Summary of results

This qualitative, descriptive, cross-sectional study revealed detailed, contextually-relevant responses regarding comprehension, acceptability and applicability of the SA PFBDGs. The FGDs revealed that study participants had heard of all the guidelines in some form or were aware of safe, healthy eating habits to some extent. When there was uncertainty or some of the participants claimed to not know about the guidelines or certain food items fellow participants could always offer some explanation to provide clarification. Understanding of nutrition among the participants was generally considered as being good and they discussed valid concerns and provided some myths regarding certain foods. Reference was made to cultural differences and taste preferences, that ultimately resulted in poor implementation of their healthy eating knowledge, specifically with the guidelines relating to lean meats, chicken, dry beans, legumes, lentils, soya, salt, fat and sugar. With regards to dietary variety and fresh fruit and vegetables, obstacles such as availability and financial constraints featured prominently. The responses are contextualised further in the discussion section (Chapter 5).

CHAPTER 5: DISCUSSION

5.1. Introduction

The first two years of a child's life is a high-risk period for the development of malnutrition and linear growth delay (i.e. stunting), especially if unsuitable, nutrient-poor complementary foods are offered during this time. After two years of age, it has been shown to be increasingly difficult to reverse growth deficiencies.[15,248,249] The nutritional status of pre-school children (aged 3-5 years) is built upon the nutritional foundation laid down in early life. Therefore, if the foundation for adequate nutrition is not ideal, suboptimal growth and development, malnutrition, and nutrient deficiencies may remain present or worsen as the child enters the school phase.[248]

In South Africa, stunting, underweight, overweight and obesity in young children are not new problems.[11,40,250] One way to address all forms of malnutrition and dietary inadequacy is through nutrition education and health promotion. Promoting SA PFBDGs for infants and young children under the age of five years could be an effective health promotion strategy.[5] Following their most recent revision, consumer-testing of the SA PFBDGs is essential for the guidelines to be successfully integrated as part of national public health strategies and to be implemented at provincial, district and household levels. In the current study, FGDs were used to elicit responses to the SA PFBDGs for the age group 3-5 years by a representative group of mothers and caregivers from communities in the Northern Metropole of the City of Cape Town in the Western Cape Province of South Africa. Information on the participants' understanding and the appropriateness of the guidelines were recorded. Comments on barriers and enablers and relevant recommendations were also noted.

Study participants represented mixed ancestry, black African or Caucasian ethnicity from formal and informal urban areas. Over three quarters of participants across all groups were mothers. In the Afrikaans Formal, Xhosa Informal and English Informal groups, caregivers included grandmothers, aunts and female teachers or community health workers. Variances in education and socio-economic characteristics in the study population provided insight into a situation where development has been surpassing infrastructure, congruent with literature on South Africa's socio-demographic and -economic status.[39,251]

In the formal and informal urban areas of Witsand and Atlantis, where the isiXhosa Informal and Afrikaans Formal participants resided, respectively, education levels were low and unemployment rates very high. English Informal participants had completed secondary education and were employed as healthcare workers for a non-profit organization in the area and therefore may not have adequately represented the Du Noon population, but they did have first-hand knowledge of the community. English Formal participants had all completed either secondary or tertiary education, lived closer to the city and had jobs. In the FGDs

that took place in Witsand, Atlantis and Du Noon; unemployment, lack of money and child grants were common topics. Those with lower education status from formal and informal urban areas that are further from the city, struggle to find employment and are financially worse off. The higher costs associated with living in informal urban areas (e.g. transport, education and health) and higher food prices in these areas contribute to food insecurity for many households.[251]

English was the most well-known language, or at least a language that was understood, to some extent, by members in each group participating in the current study. In the Du Noon area, English was the preferred language of communication among the multi-lingual and culturally diverse community. During the FGDs, there were multiple occasions when Afrikaans speakers would use English words and isiXhosa participants would ask for a guideline to be read in English to validate their understanding of the isiXhosa meaning. Similarly, a previous consumer testing study identified preference for the use of English by the Afrikaans participants.[62] In the Afrikaans and English Formal groups misunderstanding arose regarding definitions of some words with 'maas' being one such example. In these instances, there were always fellow participants who were familiar with the term in question and could explain it to the others. In this way, the FGDs displayed the language diversity in South Africa and served as a positive cross-cultural learning experience for clarifying multi-cultural concepts.

5.2. Understanding and appropriateness of the SA PFBDGs for age group 3-5 years

Mothers/caregivers who took part in this study demonstrated varying degrees of understanding of the nutrition messages embedded in the specific set of SA PFBDGs. Generally, there was a good understanding that dietary variety is important and that children need to consume adequate amounts of various foods for optimal nutrient intake and health. Participants mentioned minerals, vitamins, proteins and energy as being necessary for growth and development. 'Variety' was accurately interpreted as including different colours and food groups[61] by formal and informal groups alike. Colour and variety were acknowledged as interesting, appetising attributes of healthy foods such as fruit and vegetables. Some participants had good prior knowledge of the amount of sugar in fruit and that consumption should be monitored. Few participants falsely assumed that fruit could be eaten in unlimited amounts as they are healthy.

Among the participants, starchy foods were the most familiar, affordable and available food, particularly for children and those from the informal areas, who considered starchy foods a good source of energy. Meals often consist of maize, potato, chicken and sometimes spinach. Among the English Formal participants there was some concern about the use of the word 'starchy', which some felt sounded unhealthy and was associated with take away foods, resulting in them not taking the message seriously. Some English Formal participants recalled learning about food groups before and preferred the word

'carbohydrates.' Other participants understood 'starchy foods' to include common staple foods as well as root vegetables and legumes. Similarly, consumers in research undertaken in 2001 also expressed preference for the word 'carbohydrates.'[62] Previously, Scott et.al [62] found that consumers were concerned with over-consumption of starchy foods and it's negative health consequences. Similarly, participants in this study were aware of the negative health effects associated with overindulging in starchy foods (e.g. linking this to unhealthy weight gain and obesity) or not consuming enough other nutritious foods.

When the SA PFBDGs were tested in 2007, it was recommended that the guideline 'Feed children five small meals a day' be revised.[62] It was changed to the current version; 'Feed your child regular small meals and healthy snacks' and most of the participants in this study could accurately describe the differences between meals and snacks and differentiate healthy from unhealthy snacks, providing accurate examples of each. However, similar to findings by Love et al.,[6] the use of the word 'snacks' raised concern among some participants in the Afrikaans Formal groups of the current study, who considered snacks to be "luxury items" (e.g. unhealthy take-away foods). Other participants highlighted the need to educate the general public to clarify the differences between 'snacks' and 'meals' to avoid misinterpretation. The discussions gave rise to rewording suggestions by the English Formal participants for example; *'Feed your child three small meals and healthy snacks during the day'*. Despite minor misinterpretations, all mothers/caregivers demonstrated a firm grasp of the need to feed their children regularly throughout the day. They felt that this is important as children have a smaller appetite and cannot tolerate large, less frequent portions of food.

The study found that the concept of the need to restrict salt was generally a well-known topic. Most of the participants reported that they tried to limit salt intake, especially for children. Participants linked salt to increased blood pressure, while organ damage, diabetes mellitus, cholesterol and heart conditions were also mentioned throughout the FGDs. "Use fats sparingly. Choose vegetable oils rather than hard fats" was one of the guidelines that demonstrated cultural and economic differences in terms of taste preferences, meal quality and understanding fat classification. Although participants displayed various degrees of uncertainty around the terms "vegetable oils" and "hard fats", discussions revealed an understanding that fats are derived either from animals or seeds/plants/fruit and that certain oils may be healthier than others.

Drinking water was considered healthy and important by all participants. Water supplied by the City of Cape Town was considered clean and safe, however in the informal areas water quality was questionable and participants rather boiled, treated or bought water for drinking. In all areas unfavourable taste of water was a barrier and the parents/caregivers themselves did not enjoy drinking water and reported struggling to get their children to drink water. Scott et al. found that children in the age group 1-7 years developed a

preference for carbonated and sweetened cool drinks (SSBs) as they got older.[62] According to the South African NFCS-FB-I in 2005, juice concentrate and carbonated and sweetened cool drinks were among the items most often consumed by children between the ages of 1-9 years.[43,166] In this study, participants described preferences for cool drinks, tea, coffee or sweetened warm, comforting drinks over water. In 2008, Love et al. also showed that taste preference was a barrier towards recommended water consumption and that individuals who are further away from water sources would be more likely to drink less water.[13] As SSB consumption has been linked to tooth decay, unhealthy weight gain and micronutrient deficiencies,[72,166,171,172,174] global recommendations outline the importance of reducing individual consumption.[170] The 'drink lots of clean safe water and make it your beverage of choice' SA PFBDG is important for educating consumers, as SSB consumption increases and is contributing to public health problems and can be used together with South Africa's tax on SSB's implemented in 2018, to further encourage consumers to reduce their sugar intake.[73,74,184,252]

The importance of hygiene and hand washing were sufficiently understood. The guideline pertaining to washing of hands shows the importance of addressing indirect or 'nutrition-sensitive' factors affecting individual nutrition security.[10,32,222] The guideline 'Hands should be washed with soap and clean water before preparing or eating food' was introduced during revision of the paediatric guidelines in 2011.[223] Water, sanitation and hygiene (WASH) is one of the universal concepts to reduce the spread of infectious diseases. Lack of access to adequate water and lack of implementation of appropriate hygiene practices increase the probability of morbidity and mortality among young children due to infectious diseases.[222] Seeing as diarrhoea is one of the major causes of ill health and death for children aged 0-5 years,[219] preventative steps in this regard are of utmost importance.[222,253] The inclusion of the guideline for hand washing in the revised SA PFBDGs is one such local and individual level step.[62,223] Increasing health education on and promotion of how to prevent and treat diarrhoea through primary healthcare facilities and the implementation of strategies such as Integrated Management of Childhood Illness (IMCI) and oral rehydration solution have reduced mortality of young children.[28,223] The spread of information via community-based healthcare workers, bathroom signs, television and promotional hand washing campaigns held at ECD centres, as current participants mentioned, have improved awareness of this guideline among mothers/caregivers. The guideline seemed to be widely advertised across all areas, but even more so in informal and formal lower income areas. All participants reportedly followed this guideline and no objections were made to the wording, reflecting the potential for success in spreading vital information when sectors (e.g. health, education and sanitation) work together on important issues. To make further significant improvements in food safety and decrease the spread of infectious diseases, it is vital that government improve WASH interventions on a structural level. [223]

Some myths about certain food items were raised. Similar to recent SA PFBDG testing in Siswati,[9] eating chips was believed to give children ringworm. Other myths included that eating too much sugar can cause worms and that cooked salt or fat is healthier than raw versions. It was deduced that the latter statement might have referred to the amount of salt/fat added during versus after cooking. When evidence-based guidelines are shared, it could curb misperceptions about nutrition. In turm, greater clarity can be gained when nutrition myths are addressed through the development of education materials to compliment the SA PFBDGs

According to Schönfeldt and Hall, children in LMICs are more likely to be exposed to largely plant-based diets lacking in dietary diversity and animal source protein.[254] It has been documented that portion sizes, food variety and more expensive foods such as protein foods, are the first to be abandoned when food security is threatened, further emphasising the need for improving the ability of households, with young children specifically, to obtain concentrated, good quality dietary protein.[39,254]

Current study participants understood the nutritional value of protein and its importance in helping build a child's body. Generally, there was a clear understanding that making healthier choices regarding types of meat and fat played a role in chronic diseases (e.g. obesity, diabetes and heart disease) and that their children should learn about this. All participants considered dairy a fundamental food group for young children, identifying calcium, protein and probiotics as important for growth, development and health. 'Maas' was a word that won some discussion time. Afrikaans Formal and English Formal participants associated maas with 'African areas', Zulu or isiXhosa people, stating that it is more affordable in these areas and admitting that they themselves do not use it often or at all. All participants, however, were aware of the importance of protein and reportedly consumed protein containing foods regularly. Participants all felt that being active was particularly important for children and their physical and social development. Some caregivers stated that it is easier to see when the children are not well, because they will be less active. Educating children and forming healthy eating and lifestyle habits from a young age was emphasised.

Among FGDs in the current study, understanding and preference varied regarding dry beans, split peas, lentils and soya. The use of the term 'regularly' when referring to dry beans, split peas, lentils and soya was interpreted differently among groups. English Informal groups felt that the term emphasised the importance of these items, while English Formal participants felt the opposite. For the majority of the Afrikaans Formal, isiXhosa Informal and English Informal participants these foods were more familiar and well understood as a healthy, important part of a diverse diet. They were considered a more affordable or vegetarian alternative to meat, recognising their contribution to dietary protein. Lentils and beans were included in meals more often, for example as samp and beans, soup or biryani. Soya was used as a cost-

effective means to increase the volume of dishes when feeding bigger groups of people. The majority of the English Formal participants showed poor understanding of this guideline and erroneously classified these items as "protein snacks" (mentioning nuts, biltong and dried fruit). Some English Formal participants classified these foods more correctly as part of the protein group and indicated that they were more affordable. Mention of 'meat-free' days, where legumes or beans replaced fish, chicken or meat, showed openness to variety and an opportunity for education on healthy and sustainable diets. The 2013 technical support paper for the 'eat dry beans, split peas, lentils and soya regularly' guideline concluded that there is sufficient evidence to encourage South Africans to incorporate these foods regularly as an affordable source of essential nutrients and protein and for the prevention and management of NCDs.[94] Food production is a significant contributor to greenhouse gas emissions and reducing human consumption of animal meats has been linked to decreased greenhouse gas emissions. It is crucial that these emissions be considered, together with water and land use, in formulation of dietary guidelines and promotion of sustainable healthy eating as the human population grows in order to spare natural resources and the environment.[255]

5.3. Barriers to the implementation of the SA PFBDGs for the age group 3-5 years

Food insecurity coupled with an unhealthy food environment, characteristic of the nutrition transition, as well as taste preference, accessibility and affordability of nutritious foods emerged as barriers to the implementation of the SA PFBDGs. Enabling factors for implementation related to understanding nutritional needs of children, supportive communities and education. These barriers and enablers are discussed in more detail in the sections that follow.

5.3.1. Nutrition transition

The "double burden of malnutrition" is a well-known term for the interrelated prevalence of undernourished (i.e. underweight, wasted or stunted) and overweight or obese individuals found within the same environment.[256] Micronutrient malnutrition is not unique to those affected by food insecurity but rather this form of 'nutrient insecurity' is highly likely to be present in those who are consuming conveniently accessible, high energy diets lacking necessary micronutrients, and often in or close to urban areas.[251,257] These individuals, who are statistically categorised as overweight or obese via anthropometric measures, are thus often victims of 'hidden hunger.' Consistent with the nutrition transition, increased food security (measured by alleged reductions in hunger), increasing levels of obesity, and hidden hunger have been labelled the 'triple burden of malnutrition.' Subsequently, overweight, obesity and NCDs are resulting in adult deaths that are essentially preventable.[251,257] The fast-growing prevalence of NCDs in

LMICs, and its causal and contributing factors are becoming a greater focus of public health nutrition research as well as urgency to recognise the 'invisible crisis' that is urban nutrition insecurity.[251]

Persistent underweight, rising obesity and climate change occurring in the same place and time have been proposed as an important "global syndemic." In January 2019, the Lancet commission on obesity outlined the current planetary and human health challenges faced. The inter-related nature of these current, major epidemics contributing to the "global syndemic" was highlighted. The commission emphasises the need to identify and address the common economic and societal drivers contributing to negative economic and health environments and to the detriment of our planet in the future.[258] To this end, it is important to focus on double duty and triple duty actions to address these colliding epidemics. Double duty and triple duty actions refer to one or more actions that have more than one outcome, including for development. Breastfeeding is an example of a double duty and triple duty action in one. Improving breastfeeding figures will curb both over- and undernutrition and also contribute to increased health and well-being, which will lead to higher workforce productivity in the long-run. In the context of the "global syndemic" breastfeeding also contributes to less pollution (no waste in the formula tins, bottles and teats), and contributes to a lower carbon footprint, which can aid climate change.[258,259]

Transitions in dietary behaviour have occurred at a different pace across the diverse population in South Africa; i.e. it has initially occurred faster in the higher income groups. This has been characterised by changing food availability, demographic and epidemiological changes, relative to development and urbanisation.[71,167] While those who are socio-economically better off, strive to achieve healthier lifestyles and diets, the shift from traditional ways of eating and living to more westernised lifestyles and habits, has led to the fatal combination of inactivity and over-consumption, for those with limited resources. [71,167]

Recent South African statistics show that stunting has not decreased, over-nutrition among children younger than five years of age is more than double the current global percentage and that the combined burden of suboptimal child development and growing incidence of NCDs contributes substantially to national health costs.[11,12] The need for implementation of effective, multi-stakeholder public health actions is clearly urgent.[1] Nutritional adequacy (both under- and over-nutrition) is an increasing concern in rural areas. With South Africa's urban and productivity growth and with the number of urbanised individuals expected to rise to 70% of the population by 2030, drivers of nutrition insecurity and poverty must be recognised and quantified in order to effectively address urgent public health issues.[59,167]

Among participants in the current study, understanding of the concept of healthy foods and effects of overindulging in less healthy foods was good. Participants could relate chronic diseases (such as diabetes and hypertension) to unhealthy eating habits. Factors influencing the ability for daily implementation of the

SA PFBDGs for the age groups 3-5 years encompassed broad interrelated factors such as correct understanding of the guidelines, personal preference, motivation, planning, time constraints and affordability. Nutrition and lifestyle habits that were reportedly routinely practiced, to some extent, included consumption of starchy foods, small regular meals and snacks, consuming milk, yoghurt or maas, tinned fish and beans, lentils, soya, eggs and peanut butter, and were in line with the SA PFBDGs. Washing of hands before handling foods and young children being active, were also widely accepted and stated as being implemented. Including a variety of nutritious foods, fruit and vegetables, healthy snacks, lean chicken and meats, using vegetable oils and drinking water were less common. Therefore, it can be suggested that nutritional problems are not the result of ignorance alone but, more realistically, are also related to availability, cultural and taste preferences as was revealed in the FGDs.

In 2001, Love et al. showed adequate comprehension of the SA FBDGs in English, Zulu, Afrikaans and isiXhosa, concluding that it would be possible to implement the same guidelines across various environments and populations in South Africa, in suitable languages and supported by detailed explanations.[6] In 2008, noteworthy barriers to implementation were identified as economic, cultural and religious.[13] Practical implementation of the 'enjoy a variety of foods' guideline was a relevant concern and cultural differences were highlighted in the FGDs. Similar to results of the consumer response study in 2008,[13] taste preference, time, availability and affordability were the commonly mentioned barriers despite understanding of the importance of including variety in the diet. This indicates that appropriate education materials and examples are necessary to ensure clear understanding of the SA PFBDGs and emphasises the need for collaborative involvement across multiple sectors and stakeholders to aid implementation of the guidelines through education for the public and policies to guide positive food behaviours at local and national levels, as has been described in the Lancet commission's recent report on the Global Syndemic.[258]

Food security, ultimately comprising access, availability and utilisation of food, can be quantified in different ways but is often measured simply by hunger and under-nutrition.[260] Dietary diversity has been applied as a measure of nutrient adequacy[63,65,261,262] and low dietary variety has been associated with micronutrient malnutrition and stunting.[16,63,263] Stunting, however, has also been linked to environmental and genetic influences, irrespective of dietary composition,[20,264,265] illustrating the complex interplay of factors that contribute to the health and nutrition problems that are rising rapidly in LMICs and rapidly urbanising countries like South Africa. Urbanisation, food markets and prices as well as social, physical and household environments ultimately each have an effect on nutrition security (an outcome produced by a supportive environment, hygiene and sanitation, dietary behaviour and nutritional status of an individual).[257,266,267] The SA PFBDGs can become a fundamental tool in advocating for health and nutrition needs to be met for all South Africans via being endorsed by the DoH and informing multi-stakeholder actions and social marketing activities.[5]

Dietary diversity was inversely associated with stunting in Cambodian children <5 years of age.[22] Low variety in the diet of South African children has been presented in the form of low Dietary Diversity Scores (DDS <6) and Food Variety Scores (FVS <4).[63,268] LMICs such as Kenya, Ghana and Malawi have a DDS >6. It has been shown that a DDS <6 or 7 will most likely be found together with suboptimal height and weight for age of a child, indicating some form of malnutrition. Similarly, nutrient adequacy is most likely to be fulfilled with consumption of a diet with a DDS >5.[63] Of all South African provinces, availability of a variety of foods was greatest in households of formal and informal areas in the Western Cape Province. However, unfortunately, increased consumption of high fat, salty and sugary foods, positively related to public health issues in South Africa (such as obesity and NCD), has also been reported in the Western Cape Province.[65,150] The low DDS in relation to the FGD responses that reiterated the consumption of unhealthy foods due to taste preferance and affordability, highlight the importance of the SA PFBDG: 'enjoy a variety of foods'. This umbrella guideline should be interpreted in the context of all the other guidelines pertaining to starchy foods, fruit and vegetables, dry beans, split peas, lentils and soya, lean chicken, lean meat, fish and eggs, milk, yohurt and maas to ensure that an adequate, healthy, balanced diet is provided for young children, including the age group 3-5 years. In light of the study results, and with unfavourable carbohydrate intake patterns and mixed messages (e.g. low-carb, high-fat fads) emerging in South Africa, it is essential to provide clear information on how to include carbohydrates in a diverse diet for maximal health benefits. Based on the initial and more recent evidence for this guideline, the term 'starchy foods' aims to encourage intake of all unrefined, indigenous high-carbohydrate foods that provide protective effects against NCDs and not refined carbohydrates and sugars that have been related to the aetiology of NCDs. [61,67]

Vitamin and mineral fortification of commonly consumed staple foods (i.e. maize and wheat bread flour) according to South African legislation (2003), has improved micronutrient status of the population without substantial expansion of diversity within diets.[269] However, suboptimal iron, zinc and vitamin A levels are still prevalent in South African children. Thus, physical implementation of fortification and the value of the fortification mix itself have been questioned.[270] In the current study, vegetable gardens were mentioned as a way of teaching children about foods and increasing availability of fresh fruit and vegetables in the community. However, major challenges for such interventions included time and financial input or support, raising doubt about the significance of vegetable gardens' contribution to alleviating micronutrient malnutrition.

In 2001, Love et al. also showed that water consumption was lower than optimal levels described by the participants themselves and that those living in informal areas and who had to travel further to access clean water, consumed less water.[6] The 2007 version of the water guideline read 'offer children clean, safe water regularly'. This SA PFBDG was well accepted according to previous testing, however,

recommendations included providing more information on safe levels of water consumption and encouraging children to drink water rather than energy-containing drinks.[62] This form of detailed information has been provided in the more recent support paper published in 2013.[184] Despite knowledge on the importance of water, adequate consumption remained a challenge among current study participants and their children due to its unpopular taste and for fear of consuming contaminated water in the informal areas.

Previous consumer testing studies have shown taste preference, quick (high fat) cooking methods and unwillingness to change behaviour as barriers to using salt and fat sparingly.[6,13] Sugar, salt and fat according to this study are governed by taste preference, despite awareness of their unhealthy effects. Although all participants had a good knowledge regarding sugar, salt and fat, their consumption was restricted mainly in those already suffering from diabetes, excess weight or who were diagnosed with hypertension.

Strong, conclusive evidence supporting the role of free sugars in adverse health and dental conditions is lacking,[170] however, in the face of rising levels of NCDs, the WHO issued global guidelines for reducing sugar consumption to <10% of total energy intake, identifying weight gain as one of the main concerns related to high sugar intake.[170]

Although more research is required to gauge the consumption of SSBs and the effect on health in South Africa, a high percentage of sugar consumption in South Africa has been linked to SSBs.[166] To current Afrikaans Formal, isiXhosa Informal and English Informal participants, sugar, sweetened cool drinks, and sweet treats (chocolates, cakes, etc.) were clearly widely available, affordable and conveniently enjoyed, possibly an indication of successful, widespread marketing of these items among these populations. Afrikaans Formal, isiXhosa Informal and English Informal participants were regular SSB consumers and regularly offered SSBs to their children. Sugars were enjoyed by all participant groups when going out or for special occasions by parents and children, possibly also partly due to previous marketing of sugar-sweetened foods and beverages. The impact of sugar on dental health was highlighted in Afrikaans Formal, isiXhosa Informal and English Informal FGDs. The 2013 supporting evidence paper for the sugar SA FBDG[166] featured national increased sugar intake through daily consumption of foods such as sweets, table sugar added to vegetables and porridge, SSBs, fruit juice concentrate and jams, similar to participants in the current study. The paper also outlined the contributory role of sugar to obesity, cardiovascular disease and diabetes.[166] Research has shown that infants and young children who are given sugar-sweetened foods and beverages from a young age develop an affinity for sugar,[271] as was evident in the current study. Afrikaans Formal, isiXhosa Informal and English Informal participants indicated that it is extremely difficult to monitor their children's sugar consumption, especially when they are not at home. They demonstrated

understanding and willingness to follow the guideline but felt that detailed examples and education would be necessary for the general South African public to fully understand this guideline.

Following the Declaration on NCDs (Moscow, 2011)[272] and supported by the World Health Assembly in 2013, the WHO Global Action Plan for the Prevention and Control of NCD 2013-2020[140] was released. The ultimate aim of reducing millions of preventable deaths resulting from the top non-communicable causes of mortality (namely cardiovascular and chronic respiratory diseases, cancers and diabetes) by 25% was accompanied by targets for reducing alcohol, tobacco use and sodium consumption and increasing levels of physical activity.[140] The Plan also offers recommendations for reducing the early incidence of NCDs through changes in marketing of foods and non-alcoholic beverages to children, recognising that marketed items often contain high amounts of sugar, salt or fat and potentially influence food preferences and requests of children.[140] In 2011 South Africa made a commitment to address NCDs through reducing salt, sugar and fat consumption, promoting healthy diets and exercise as part of the Strategic Plan for the Prevention and Control of Non-Communicable Diseases 2013-17, all elements which have been included as part of the SA FBDGs and PFBDGs.[142] Strategies described include creating an environment that supports healthy lifestyles; the reduction or elimination of advertisements for unhealthy foods directed towards children and exerting more control over foods that are made available to children (e.g. at schools). The potential for civil society organisations in improving health education and facilitating adoption of healthy lifestyle habits among children on is advocated as well. [142]

In 2013, the WHO recognised hypertension as responsible for more than half of the deaths attributed to cardiovascular diseases.[273] Clinical trials have shown that decreasing dietary sodium intake lowers blood pressure.[274] The majority of the South African elderly population (>65 years of age) suffer from hypertension. Almost 50% of individuals over the age of 15 years were diagnosed with elevated blood pressure according to 2016 statistics and prevalence seems to increase with age.[12] Salt consumption by South Africans has been recorded at >6g per day [138] which is over the 5g per day recommended by the WHO.[273] The SA DoH has considered local and contextually-relevant sodium and blood pressure evidence and agreed that salt reduction is a cost-effective pathway to lowering incidence of cardiovascular complications.[142,275] Meetings with the food and production industries resulted in the establishment of acceptable salt reduction legislation, initiated in 2016, with plans to advance progress in 2019.[142] It has been estimated that decreasing the sodium content of commonly consumed foods in South Africa could potentially save thousands of lives and millions financially, through preventing cardiovascular events and reducing the NCD burden on the health system.[137] It has been proven that diets consisting of generous amounts of fresh fruit and vegetables, whole grains, nuts, low-fat dairy and limited saturated fats can contribute towards decreasing blood pressure.[132,274] These recommendations are largely encompassed in

the SA PFBDGs and have the potential to improve health through early education for healthy dietary choices, and to minimise the morbidity and mortality due to heart disease and other NCDs.

More recently, a community-level consumer study in the Eastern Cape demonstrated a lack of awareness and understanding of salt usage among consumers, highlighting the importance of promoting salt reduction, more specifically, at individual and household levels to achieve health benefits.[276] Even though there was a consensus among the current study participants that other spices can be used when cooking food, abandoning salt use completely was not considered, since participants felt that even just a pinch was necessary, most of the time. Nevertheless, this guideline should be stressed, since many participants indicated that they and their children consume salty foods, in addition to adding salt during food preparation.

Taste preferences and cultural norms were the main barriers to the fats guideline, along with classification of fats and affordability. The role of implementing more sophisticated, less healthy cooking methods has been described in nutrition transition literature and presents a relevant obstacle to implementation of recommended dietary practices.[39] Animal fats were clearly favoured among lower income areas, in black African as well as mixed ancestry cultures and were associated with superior quality of the meal. Participants' enjoyment of fatty meats and difficulty changing old habits in their adult years now reiterates the importance of fostering healthy habits to last a lifetime from childhood.

Wording used in the salt, sugar and fat guidelines was surprising to some participants. For example starting the guideline with the word 'Use sugar/fat/salt…' was interpreted as encouraging or instructing the use of what they understood to be unhealthy additives. English Formal participants suggested rather starting with *"if you use sugar…"* The word 'sparingly' was unfamiliar to some and highlighted the importance of explaining the wording used to successfully implement the guideline. Participants themselves concluded that more detailed explanations and examples would be necessary to enable the general public to implement the salt, sugar and fat specific SA PFBDGs.

5.3.2. Affordability and accessibility

Although there was repeated emphasis on the taste of foods and cultural norms among FGDs of the current study, affordability and accessibility were unavoidable factors shaping eating behaviours, especially among those from isiXhosa and English informal and Afrikaans formal lower income areas. FGDs revealed a pattern of unhealthy food choices guided by availability and accessibility, taste preference and short-term satisfaction over healthier choices that could benefit participants' health in the long-term. These patterns are becoming unhealthy habits amongst children.

All study participants expressed an understanding of and willingness to follow the 'enjoy a variety of foods' guideline. However, many of the participants questioned availability and quality of fresh fruit and vegetables. Short shelf-life and storage were identified as barriers to implementation of the guideline. Those who were unemployed generally bought staples such as rice and maize to feed their families, which provide more energy and satiety than fruit and vegetables. Fruit, vegetables, healthy snacks and meat were most often described as expensive and scarcely available. However, street vendors and market stands selling fresh produce were widely visible in Witsand and in Atlantis, suggesting that other factors play a vital role in suboptimal fruit and vegetable consumption, perhaps related to the low popularity of these foods or increased availability of more convenient, less healthy foods and children not eating vegetables that mothers/caregivers buy. Poorly prepared vegetables at créches and peer influence were also said to contribute to lack of enjoyment of fruit and vegetables, pointing out the need for education and recipes for preparation to optimise taste and aesthetic appeal and to help increase consumption. In contrast, wide affordability and ease of access to variety was mentioned among the English formal participants.

Consumption of unhealthy fats was allegedly limited (especially for the children) but hindered by the higher prices of healthier fats and meats in the lower income areas. Eggs, tinned fish or beans, polony or peanut butter were consumed more regularly as cheaper protein-rich options. Healthier cooking methods to reduce fat consumption were practiced mainly by those already suffering from chronic diseases. Even though information regarding lean protein sources was well-known among most of the participants, a lack of implementation of the 'lean' guideline was evident, emphasising the need to improve affordability and access to healthier fats and meats. The English formal participants seemed more able and likely to follow the fat guideline. Yoghurt, maas and dairy, foods were consumed daily or weekly amongst all groups but considered expensive and as a treat to some participants in the informal isiXhosa and English and formal Afrikaans groups.

Factors of concern regarding plant-based protein sources included longer cooking times (more electricity used), gas-forming properties, and seasonal preferences, e.g. more likely to cook some of these foods in winter than in summer. Cross-cultural interaction was showcased as Afrikaans mixed ancestry and English Caucasian participants spoke of using lentils in traditional Indian recipes. Including suitable recipes as part of SA PFBDGs implementation actions could possibly help to increase dietary variety and diversity.

In this study, informal and formal lower income participants described relying on starchy staple foods when animal protein was not affordable. In South Africa, the typical diet of very low income families has been found deficient in protein due to minimal intake of animal source foods and excessive intake of cheaper, starchy foods.[254] Protein utilisation in the body depends on the type and quality of the protein and other

foods in the diet. Animal source foods have been classified as sources of superior quality protein, providing all essential amino acids, vitamin A and B12, important trace elements and minerals in relatively small portions. Milk has also been proven to stimulate growth factors in young children as well as providing protein, energy, vitamin A, B12 and calcium, positively affecting growth and nutritional status, especially in malnourished populations in developing countries.[254,277] In comparison, grains and vegetables offer minimal protein, only providing all essential amino acids when appropriately combined and in larger portion sizes, i.e. requiring more food and greater variety of foods – both difficult to achieve for vulnerable populations residing in informal urban or rural areas. Physiologically, high levels of phytic acid resulting from a diet consisting mainly of grains and vegetables also has a negative effect on the absorption of essential micronutrients such as calcium, iron and zinc.[254,277] Therefore, accessibility of animal source proteins, e.g. milk, eggs, chicken, fish and meats, play a key role in growth, development and nutritional status of young, children, especially those living in poverty. Participants in the FGDs frequently mentioned cost and low availability of healthy animal source protein foods, which needs to be addressed for desired implementation of SA PFBDGs across the national population.

Poverty in South Africa has been quantified through the Living Conditions Survey (LCS) approach and poverty lines established in 2012, which are described in more detail by Statssa.[278] Utilising consistent data collected via the Income and Expenditure Surveys (IES) since 2005, Statssa recently gave an overview of poverty and its patterns. The LCS and IES provide measures of progress towards SDG one and 10, encompassing reductions of poverty and inequality by 2030.[278] The Food-based Poverty Line (FBPL) is the level below which individuals cannot access or consume enough food. Overall, poverty in South Africa was measured by the Lower-Bound Poverty Line (LBPL), which is slightly higher than the FBPL, but below which individuals need to reduce money spent on food items to be able to afford other living expenses. Poverty in South Africa has been undulating from 2006-2015 with notable reductions in poverty as well as the degree of poverty up until 2011 followed by slight but gradual increases since then, with an estimated 40% of the population below the LBPL in 2015. The report identifies people from rural areas as the most vulnerable with black African and mixed ancestry individuals being highly predisposed to poverty. It was noted that the greater share of poverty, held by rural households up to 2006, has changed to being held by urban households since 2009.[278] This report thus clarifies that the recent trend no longer shows decreasing poverty but rather increasing levels and degrees of poverty among the poor in South African rural and informal urban areas, where malnutrition is prominent. FGDs in the informal and formal lower income urban areas revealed concern regarding affordability of some of the foods promoted through the SA PFBDGs. Unemployment was a concern in these areas as well, highlighting underlying factors that need to be addressed in achieving food behaviour changes.

Child grants were a source of income for residents of urban informal and formal lower income areas in the current study and low income was a major issue in relation to the ability to implement the SA PFBDGs. In Johannesburg, investigation of nutrition security in formal and informal urban areas found that informal residents were exposed to a myriad of environmental and socio-economic circumstances disproportionately predisposing them to nutrition insecurity and NCDs. The ability to access food through purchasing is diminished in low income households and they tend to rely on cheaper, nutrient poor staples (e.g. maize, bread) to suppress hunger, sacrificing dietary diversity and nutrient density.[266] Similarly, Indonesian families living in urban slums and forced to decrease food expenditure are more likely to increase expenditure on less nutritious staples (e.g. rice). The resulting decrease in purchase of nutrient rich foods, particularly animal source foods, has been associated with stunting among 0-59-month-old children.[22,279] Informal urban participants repeatedly mentioned the increased availability and affordability of the staple foods in their diet, which included maize meal and bread, in comparison with lean meat or chicken, fruit and vegetables, which could therefore ultimately have a negative impact on their child's dietary intake and nutritional status. The term 'urban poverty' has become well-known in the realms of malnutrition, food and nutrition security. Research has unveiled the phenomenon of stunting and nutrient deficiencies in urban areas and areas where availability of food is not to blame as much as affordability and access to nutritious foods. It has been shown that increased income and dietary variety may actually represent increased consumption of a larger variety of unhealthy foodstuffs.[39] In line with such findings, examples of this were the availability and convenient enjoyment of oily take away foods, salty snacks such as chips, juice, SSBs, sweets and sweet treats such as chocolates and baked goods mentioned in the FGDs.

Economic access to food is thus a key determinant of food security. The South African National Minimum Wage Panel recently summarised the 2016 employment statistics in South Africa.[280] They reported that to consume 2100 calories a day would cost approximately R446 per person, per month. Statistics show that almost 20% of South Africans cannot afford this. While 26% of the population was categorised as unemployed, 12% were reported as earning <R4 000 per month, placing them beneath the working poverty line. Roughly eight percent of the population earn less than R2 500 per month and can barely support minimal dietary requirements for a family of five. Women have been identified as the most vulnerable to unemployment and poverty. South Africa is known as an extraordinarily unequal society facing economic, environmental and health challenges. Careful contemplation and implementation of national minimum wages is one strategy to lift individuals out of poverty and address economic inequity in the midst of rapid development.[280] Therefore, minimum wage is a nutritionally-sensitive approach that could positively contribute toward food affordability and access for the most vulnerable and to help some of these individuals to implement health and nutrition interventions such as the SA PFBDGs.

Access to adequate food is a major obstacle to food and nutrition security and was an issue mentioned in the FGDs. Data from the 2008 African Food Security Urban Network provided insight into the situation of the poor in the informal urban areas. It highlighted that many of the urban poor need to rely on various means, including informal and formal markets and safety nets, to gain food access. Therefore, contributions and the cooperation of both formal and informal sectors affecting food distribution is key.[281] The WHO Commission on Social Determinants of Health (2008) report drew attention to the impact of socio-economic characteristics of health in LMICs. This report outlined improvements in education, employment and conditions of work to help advance socio-economic status and health.[58] The South African National Development plan 2030 is focused on reductions in poverty and inequality in South Africa. Basic infrastructure and education have been recognised as insufficient, substandard and in need of attention. The plan emphasises the need for departments and stakeholders to work together as this will enable sectors to collectively achieve their goals.[59] The income and education level of mothers/caregivers has been linked to the health of their children[264,282] and will also influence how they understand nutrition education and their ability to implement the SA PFBDGs.

In this study, affordability of a healthier diet was a major concern, especially among the informal and formal lower income participants. It has been shown that healthier diets are generally more expensive in South Africa.[283] Less healthy, better tasting, conveniently accessible foods (by elimination of preparation and storage needs) hinders the adoption of healthier eating habits, as was recorded in the FGDs. Convenience and access should rather be empowering and supporting individuals to make healthier food choices, as this is a major goals of current global and national strategies. The cost of a healthier diet can be reduced by facilitating better informed choices although, revolutionising unhealthy food consumption patterns will ultimately require some form of government intervention and food price adjustment.[283] A study of the network of food distribution in an informal urban area near Worcester in the Western Cape Province in South Africa, depicted the fundamental role of local (informal) food retailers in the nutritional well-being of the communities in low income areas.[284] Results of the study highlighted food availability and prices as major hindrances to consumption of a healthy diet. Investigators reported that the smallest, most accessible retailers' stocks were limited, especially low in variety of fresh produce, including meat and eggs. As a result of lack of finances and buying power themselves, prices are higher than in larger, distant supermarkets. It was concluded that multi-sectoral measures (e.g. including transport and safety) to improve variety, quality and accessibility of foods to community food retailers, i.e. spaza shops, cafés and street vendors, are clearly necessary in low income areas to improve food distribution and nutrition security in poorly serviced areas.[284] This might also explain the low availability and high prices mentioned in the FGDs held in Atlantis and Witsand.

Food security literature has attributed twenty-first century food insecurity largely to structural, economic, social and agricultural factors. As urban population density increases, communication between researchers and policy makers becomes more crucial in guiding future development.[39,257] A systematic review, reporting on food security in South Africa, concluded that well-planned, integrative approaches are required to address income, production, availability and affordability of food and the risky coping strategies or trade-offs among food insecure individuals that might result in immediate gratification but carry lasting impacts on their lives and long-term nutritional health and the health of their children.[269] Therefore implementation of the SA PFBDGs and adult SA FBDGs can only be achieved through integrative approaches.

An example of a comprehensive, collaborative approach is the work of the Enhanced Homestead Food Production (EHFP) programme through Helen Keller International (HKI), originally initiated in rural Asian low-income areas and now in Africa as well. This has shown that implementation of an integrated programme which addresses broad, underlying determinants of health and nutritional status in a holistic manner, has great potential to positively affect food production and consumption habits, and improve nutrient intake, e.g. vitamin A and iron. The programme provides education to and empowers mothers, improves hygiene practices and increases household income, gender equity, dietary diversity and meal frequency among young children. Monitoring of the programme and its outcomes is continuous, and adaptations are made in line with evidence gathered. Behaviour change communication is an additional strategy now included in the programme that aims to assist and enhance the implementation of evidence-based nutritional guidelines, highlighting the importance of consumer-testing of communication messages, [285] which could include FBDGs.

5.4. Enabling factors to the implementation of the SA PFBDGs for the age groups 3-5 years

Agriculture and social welfare (i.e. food production and accessibility) have great impact on nutritional wellbeing. Increasing the accessibility of healthcare and food by providing money or food (for example, national child grants or the nutrition therapeutic program of the INP in South Africa) to those in need can also improve the nutritional status of children marginally. Education is essential for individual and societal empowerment and contributes to achieving optimal nutritional wellbeing. Malnutrition in all forms can therefore only be meaningfully addressed through interventions by various sectors producing double/triple duty actions with the ability to address more than one and often inter-related problems, simultaneously. For example, using national FBDGs to address over-nutrition, under-nutrition and to contribute to decreasing environmental degradation through reducing consumption of animal products that have been related to significant greenhouse gas contributions.[32,258,286]South Africa's National Integrated Plan for Early Childhood Development considered delivery of child services, education of parents/caregivers and community development as part of the fundamental aspects of improving young child development.[287] The

National Integrated Childhood Development Policy is currently being finalised and outlines healthcare, nutrition, parent support and social protection strategies in detail to aid implementation thereof.[288] The 2017 South African Early Childhood Review highlighted government responsibilities and the urgency of implementing ECD and parent interventions.[289] This attention on ECD also provides an excellent opportunity to recognise the importance and role of SA PFBDGs in ECD.

It is becoming clearer that changes at government, infrastructure (macro) and facility/service provider (meso) levels contribute significantly to consumer dietary behaviour, individual nutritional status and overall health and wellbeing. An obesogenic environment exists in many LMICs and rapidly urbanising countries, characterised by motorised transport, increased availability of cheap ultra-processed foods, largely economically driven governance and overpowering food industries that focus on economic productivity, discounting human health and environmental sustainability. Although evidence-based policy design has progressed in many countries, and been recognised at global, governance and macro levels, lack of progress toward decreasing the malnutrition (excess and deficient forms) epidemic has been attributed to policy inertia at meso (facility/service provider) and micro (individual) levels. Further, significant opposition from leading food procurement industries and the lack of public demand for action contribute to slow policy implementation. The Lancet commission on obesity agrees that empowered members of society can play instrumental roles within their immediate environments that, collectively, can influence current human systems (e.g food and agriculture, transport, urban design and land use). This could lead to systems reorientation towards more equitable, human and ecologically sensitive systems, while still being economically viable.[258]

5.4.1. Supportive communities and environments

According to the current FGDs, children from the informal and formal lower income areas were more likely to be referred to clinic nurses or dietitians. This, however, was typically for management of malnutrition rather than prevention, highlighting the need to strengthen implementation of prophylactic interventions. With significant economic, environmental and socio-demographic changes taking place worldwide, one dimensional interventions are insufficient. Nutrition-sensitive approaches are necessary to address underlying issues (e.g. lack of resources, income, education, WASH and healthcare) and increase the reach of nutrition oriented interventions (e.g. vitamin supplementation or food parcels).[32] Human nutrition depends on changes in food production, food access, WASH, healthcare and education. Similarly, the growth and development of young children is sensitive to multiple factors of the early environment created and provided by mothers/caregivers with the resources available to them, collectively known as nurturing care.[24] Personal well-being of and available resources to future parents are somewhat dependent on national political standpoints and environments. Appropriate political and legal actions contribute to

building supportive communities and enabling home and public environments which in turn can markedly impact early development of children positively.[24] The current study revealed that caregivers are willing to support and help each other, but require additional support in the form of improved access to and knowledge of healthy eating.

Current informal and formal lower income participants voiced challenges regarding access to foods. This points to a critical niche for informal food markets in South Africa, as described by Roos et al. in Worcester in the Western Cape Province[284] and Drimie et al. in Johannesburg in the Gauteng Province.[266] Structural, economic and legislative support of such markets can significantly improve the accessibility of healthier diets. Combining, for example, increased affordability and accessibility of healthy foods (e.g. through child grants or price reductions in combination with reorientation of food production industries to supply affordable healthy foods) with implementation of nurturing care practices (including optimal child support, stimulation and protection) could have a great positive impact on nutritional status of young children.[25]

The Global Nutrition report of 2018 yielded five critical steps for accelerating worldwide progress towards SDG 2.2 of ending all forms of malnutrition by 2030. These steps include:

- maximising investment of valuable resources and its outputs via multi-sectoral policy integration and collaboration to ensure that interventions are designed to counteract more than one form of malnutrition, providing double duty actions when possible;
- investing in relevant data collection and translation of data for all stakeholders, to provide a strong basis for governance and macro- and meso-level decisions on when and how to act;
- building on existing, and increasing, targeted financial support to ensure implementation of nutrition interventions together with improving human and insitutional capabilities for such action;
- prioritising holistic interventions (built on evidence of past interventions across the globe) that can positively influence the food environment and worldwide malnutrition through increasing attainability and feasibility of healthy eating for all, and;
- ensuring consistent implementation, reporting and accountability of such interventions via signatories, donors, bussiness and governments, to end all forms of malnutrition.[286]

5.4.2. Education

The Lancet 2017 early childhood development series links individuals' parenting behaviour to their own childhood experiences and describes the importance of preconception parental well-being and education.[290] Among children, nutritional interventions combined with stimulatory activities show greater potential for improving child development.[290] Vegetable gardens were suggested as a means to educate children and improve nutrient intake in the current study, but participants also voiced that this would

require careful planning and various sustained inputs. Other similar strategies could include nutrition promotion activities being held at pre-schools or nutrition being incorporated into school curricula and education and training for caterers at créches/day-care facilities for young children.

Education can be directly linked to health and nutrition sectors (along with integrative social protection). As a key to implementing and enhancing nurturance of young children, nutritional education can be incorporated into existing health or nutrition interventions [25] (e.g. in the IMCI, the Road to Health Booklet, and as part of social protection and early childhood development strategies in South Africa) in the form of SA PFBDGs. In-depth explanation of each guideline and detailed examples were identified by current participants as necessary to help the general public understand some of the guidelines well enough to implement them. Clinic nurses and health facilities, healthcare workers, radio, television and schools were the most common sources of information and should therefore remain important platforms for nutrition and health promotion activities and communication of the SA PFBDGs. Field-testing of the SA PFBDGs is one step towards making sure that public nutrition information is appropriate and well understood by all.

5.5. Study limitations

Challenges were inevitable, commensurate with the nature of the research. Recruitment of eligible participants who were willing to devote their time to being part of the study was not always possible, especially in the formal areas. Household and community level recruitment in the informal and formal lower income areas was easier and provided larger groups of participants. Identifying informal English-speaking participants posed a challenge and was overcome by a diverse community where English was the preferred language of communication. Formal isiXhosa and informal Afrikaans participants were difficult to reach, and thus there are no data for these groups resulting in the possibility that certain responses were not heard. Formal English mothers were mostly working or unwilling to sacrifice their time, therefore only 2 FGDs took place, consisting of 2-3 participants. In the future, recruitment of busy mothers/caregivers in formal areas may be simplified through stronger collaboration with ECD centres and planning discussions well in advance to allow them to schedule time to participate.

CHAPTER 6: CONCLUSION AND RECOMMENDATIONS

This qualitative study assessed the comprehension and appropriateness of the SA PFBDGs for the age group 3-5 years among mothers/caregivers in formal and informal areas of the Northern Metropole of the City of Cape Town in the Western Cape Province in South Africa. FGDs were held in the three dominant languages in the Western Cape, i.e. English, Afrikaans and isiXhosa. Socio-economic characteristics, education and employment were considered in the compilation of the groups. Responses to the SA PFBDGs were recorded during the discussions. Recordings were transcribed and content analysis was performed on the data.

Results showed that, overall, the SA PFBDGs for 3-5 years olds were mostly well understood among participants in all languages and socio-economic groups. However, several participants mentioned lack of time, laziness and high stress levels as barriers to preparing meals that met the SA PFBDGs. This suggests that factors other than knowledge or awareness also influence dietary choices and eating habits, as has been found in similar studies and global data.[13,258,286] Persistent barriers to application of the guidelines were found to be taste and cultural norms, lack of time for food shopping and preparation, and limited availability and unaffordability of certain food items. Dietary variety was more achievable in formal areas. Participants from formal backgrounds who had higher education and income demonstrated a more detailed understanding of nutrition and actively sought nutrition advice more often. Conversely, in the informal and formal lower income areas, participants were more likely to be professionally referred for management of existing child malnutrition. Continuing with relevant and consistent nutrition education and promotion of messages such as the SA PFBDGs through existing pathways (i.e. clinic nurses, health facilities, healthcare workers, radio, television and schools), together with advocating nutrition-sensitive approaches by other sectors, can boost reductions in child malnutrition as described by Bhutta et al., in the Lancet Series on Maternal and Child Nutrition (2013).[291]

The role of certain foods in NCDs was described by the study participants and efforts made to implement healthy eating habits were mentioned, albeit mainly only for children or for adults already suffering from NCDs or at risk thereof. Thus, public healthcare still maintains a largely curative stance, indicating that preventative approaches need to be strengthened in the South African healthcare transformation as has been reiterated by Mayosi et al., Lancet (2009)[1]. Addressing the growing prevalence of NCDs proactively is essential, while continuing to implement strategies that address acute needs (i.e. infectious diseases and advanced NCDs) is critical. Forming a relationship with patients and adjusting care for their specific needs, in a holistic manner, are important aspects for the implementation of sustainable lifestyle changes.[1] Nutrition education for parents/caregivers and pre-school children using the SA PFBDGs can go a long way towards reducing malnutrition of all forms, preventing NCDs and improving lifestyle habits and overall health in line with the DoH's Strategic Plan 2016-2020[57] and the National Development plan 2030.[59]

Mothers/caregivers in this study recognised the importance of teaching their children healthy habits early in life in order to avoid ill health later in life and were well aware of how adults with NCDs can suffer. This demonstrates that there is some level of willingness to do what they think is right and are taught is right, but it seems that eating habits are also strongly dependent on societal and environmental determinants (financial and physical accessibility) especially in the informal and formal lower income areas. Motivation to buy and prepare healthy foods is an important aspect of practicing healthy eating behaviours. This highlights the importance of multi-stakeholder engagement in planning and implementing eating behaviour change interventions together with social marketing principles to normalise healthy food choices. Many of the factors influencing 3-5-year-old child nutrition are no longer under control of the mothers/caregivers alone. Population-wide understanding and nutrition education (at crèches, day care facilities and at household level), improved infrastructure and greater accessibility need to come together if nutrition practices are to be improved. Child malnutrition has been traced back to maternal health status before conception, and, similarly, continued suboptimal nutrition of young children has been traced back to the educational status of the parents or caregivers.[32] Thus, the importance of overcoming barriers and strengthening environmental healthy eating enablers before conception and birth, as well as during infancy and young childhood when growth and development is accelerated (and affects adult potential and future generations), has been recognised.[32,285] This includes creating supportive communities (demand) and minimising commercial barriers (supply).[248] For example, acknowledging the important role food production and distribution systems in both formal and informal areas and enhancing accessibility to healthy foods, especially in informal areas through programmes that assist small, local retailers to purchase these foods at lower prices.

The study participants demonstrated knowledge on infant and young child feeding with reference to the need for smaller portions, healthy snacks and the importance of hygiene. Key factors influencing nutrition and lifestyle for these children and possibly hindering implementation of the SA PFBDGs, as mentioned by the participants, included their more energetic, curious nature and time spent away from home. The mothers/caregivers in the study repeatedly described not being able to ‘police’ their children everywhere, every day and mentioned that they can make an effort to implement the SA PFBDGs but they would still have no control over what other caregivers do, emphasising the need to educate fathers/partners and other caregivers in a child’s life and designing an enabling environment at macro- and meso- levels that is conducive to healthy choices outside of the home. This is an age group where multiple people have influences over food choices and foods given, but it is also an age group in which stunting remains a pertinent issue and overweight/obesity is a rising threat. It is therefore critical to give consideration to the many entry points where those involved in the provision of food can be reached by the SA PFBDGs. As the

lasting impacts of malnutrition can negatively affect adolescent and adult potential, if left unaddressed, as has been reported in LMICs, it is essential to improve nutrition practices at this time in the lifecycle.[1,17,32] Global and national inter-sectoral collaboration during the development of public health policies and messaging to address nutrition changes is the beginning of what is being shown to be an effective approach.[32,248] Nutrition sensitive interventions provided by various sectors (e.g. agricultural, social protection, child development and educational) have been explored and actively engaged to improve nutrition outcomes.[14,32] Multiple factors influence the attainment of optimal nutrition and enable or disable the intake of a nutritionally adequate diet and contribute to the enigma of urban poverty.[39] All these important entry points need to be considered and addressed in order to improve childhood nutrition. There is evidence for what constitutes appropriate feeding and this should be supported through clear communication of appropriate nutrition messages designed specifically for the 3-5 year age group.[5] Following the intense focus on the first 1000 days and improvement of child nutrition, nutrition education and interventions for caregivers of 3-5-year-old children are proving crucial to maintain optimal nutrition.[32] Nutritional support is part of the essential package of ECD services which has been outlined in the National Integrated Plan for ECD by the South African Department of Social Development.[289] Reaching and monitoring children in the 2-5 year age group has proven difficult in South Africa due to societal and economic inequalities and the resulting unequal access to ECD group programs by these children. Setting up conditional grants for ECD and increasing support for crèche/preschool teachers and owners are key interventions to be implemented.[289] The SA PFBDGs can be incorporated as part of the training for such practitioners in order to ensure consistent messages in both communities and households regarding optimal child nutrition. More research is necessary in this age group of children to devise the most effective interventions and educational materials to enable the children to adopt healthy eating behaviours early on.

This study marks the completion of consumer testing of the revised SA PFBDGs among South African mothers/caregivers of children from 0-5 years of age. Study findings for each age of the groups; 0-6 months, 6-12 months, 1-3 years and 3-5 years were presented at the Nutrition Congress of 2018 to a professional audience including national DoH representatives. In addition, preliminary educational illustrations of the SA PFBDGs are being finalised in collaboration with Stanford University, Centre for Health Education, to depict each guideline and improve the comprehension and acceptability of the guidelines. It is the hope of all of the researchers that were involved in the testing of the SA PFBDGs that the guidelines will now be adopted by the DoH and then be incorporated into relevant policy documents and programmes at all levels (national, provincial, municipal, and local) as soon as possible in order to curb misinformation and facilitate adoption of healthy food behaviours and optimise child health.

Prioritisation and implementation of actions geared toward the issues of childhood nutrition and NCDs must be followed through urgently in order to achieve SDG 2.*2. 'By 2030, end all forms of malnutrition,*

including achieving, by 2025, the internationally agreed targets on stunting and wasting in children under five years of age, and address the nutritional needs of adolescent girls, pregnant and lactating women and older persons' and SDG 3.4: 'To reduce by one third premature mortality from NCDs through prevention and treatment and promote mental health and well-being by 2030'.[31] Evidence and policy drafting support the health and nutrition promotion process, but lack of appropriate, full-scale implementation of health and nutrition interventions is impeding practical follow-through.

The WHO Independent High-level Commission on Non-communicable Diseases[292] has illustrated the financial, structural and political challenges. The commission recommends promoting healthy diets, among other lifestyle interventions, to reduce occurrence and complications of NCDs. Urgent interventions by multiple stakeholders are required, especially as risk factors for NCDs and complications thereof are becoming more common in younger individuals. While respiratory- and cardiovascular-related NCDs mortality numbers have dropped, the same has not been observed for obesity and diabetes.[292] The SA PFBDGs provide an avenue through which to support healthy habits and promote food safety and nutrient adequacy from an early age. The guidelines communicate the importance of reducing consumption of salt, fat and sugar, all associated with NCDs. Consistent with the WHO commission, the promotion of SA FBDGs aids in empowering individuals and increasing accountability for their own health and the health of their children in addition to the globally recommended guidance of policies and services offered by governments.[292]

The goal of the SA PFBDGs is to promote dietary patterns that will provide sufficient energy, protein and nutrients and shape healthy eating habits among children that they will carry with them into adolescence and adulthood.[5] The SA PFBDGs aim to address the multiple burdens of malnutrition in South Africa and contribute to ending malnutrition in all its forms. The WHO 2008 Report of the Commission on Social Determinants of Health, advocates for investments in early childhood development. It also recognizes the improved societal contributions, in terms of social development, economic potential and achieving health equity, of all-inclusive child care and highlights the importance of early childhood health and nutrition and the potential to address under-/over-nutrition sooner rather than later.[58]

Recommendations in terms of the wording used in some of the SA PFBDGs for the age group 3-5 years, according to FGD responses are as follows:

- 'Give your child either milk or maas or plain, unsweetened yoghurt every day.'
- 'Feed your child three small meals and healthy snacks.'
- 'If you use sugar and food and drinks high in sugar, use it sparingly.'
- 'If you use salt and foods high in salt, use it sparingly.'

In conclusion, this study has added to the knowledge on consumer acceptance, comprehension and implementation of the SA PFBDGs for mothers/caregivers and children in the age group 3-5 years. The study participants emphasised the importance of clarifying the meaning and understanding as well as providing examples of the guidelines (especially salt, sugar and fats). This study acknowledges that there is an understanding and know-how by mothers/caregivers regarding many of the guidelines across various environments but that implementation is not always followed through due to barriers beyond consumer knowledge. Dissemination of the guidelines and their rationales on a larger scale and in accessible formats to the public can help to minimise confusion and mixed messages and to ensure that those making food decisions receive consistent messaging. This can be achieved by designing SA PFBDG promotional campaigns, presentation formats and educational programmes, accompanied by wider global and national nutrition sensitive actions. In addition it will contribute to building a supportive environment and increasing access to healthy food which in turn will improve the efficacy of the SA PFBDGs in contributing towards improved child health and ultimately South African population health.

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Addenda

Addendum A: Letter to CBO

UNIVERSITEIT•STELLENBOSCH•UNIVERSITY
jou kennisvennoot • your knowledge partner

6 September 2017

To Whom It May Concern

Your facility has been selected as one of the institutions to assist and/or participate in a research study. The title of the study is: *"Field testing of the revised Paediatric Food-Based Dietary Guidelines amongst mothers/caregivers of children aged 0-5 years in the Western Cape Province, South Africa."*

The aim of this study is to determine the appropriateness and understanding of the proposed Paediatric Food-Based Dietary Guidelines. We will be conducting Focus Group Discussions with mothers/caregivers who have or have taken care of children between the ages of 0-5 years. For the purposes of the current study, we will be testing the messages for the 3-5 year old group.
Individuals who will be included in the study should be:

- Female
- Over the age of 18 years
- Permanent residents of this area
- English, Afrikaans or isiXhosa speaking

Mothers/caregivers will be expected to discuss and share opinions on certain questions with the other group members. The discussions will consist of 6-8 participants and will be approximately 60-90 minutes long. The discussions will be recorded but all information will be kept confidential. Refreshments will be served and participants will be given a pen and parcel of healthy snacks as a token of appreciation.

Yours Sincerely

[redacted]

[redacted]

Principle Investigator
Division of Human Nutrition, Stellenbosch University

Fakulteit Geneeskunde en Gesondheidswetenskappe
Faculty of Medicine and Health Sciences

Afdeling Menslike Voeding • Division of Human Nutrition

Posbus 241 / PO Box 241 • Kaapstad / Cape Town, 8000 • Suid-Afrika/South Africa
Tel: +27 21 938 9259 • Faks/Fax: +27 21 933 2991

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jou kennisvennoot • your knowledge partner

Please complete the section below:

I, _____ (individual's name), hereby declare that

_____ (institution's name) will be able to help recruit participants for the focus group discussions.

Signature: _____ Date: _____

Fakulteit Geneeskunde en Gesondheidswetenskappe
•
Faculty of Medicine and Health Sciences

Afdeling Menslike Voeding • Division of Human Nutrition

Posbus 241 / PO Box 241 • Kaapstad / Cape Town, 8000 • Suid-Afrika/South Africa
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Addendum B: Household recruitment form

RECRUITMENT FORM HOUSEHOLD

Code: RFH_____

Good morning / Good afternoon

We are looking for volunteers for a research project who are mothers/caregivers over the age of 18 years of children between the ages of 0-5 years. Is there such a person in this household?

☐ ***No*** – Thank you for your time. Have a lovely day.

☐ ***Yes*** – May I speak to her please?

☐ ***Not at home*** – When will she be back? ……

We are conducting a study to determine the appropriateness and understanding of the new Paediatric Food-Based Dietary Guidelines amongst mothers/caregivers of children aged 0-5 years. In order to gain this information, we will be having group discussions with other mothers/caregivers. You will be expected to discuss and share opinions on certain questions with the other group members. The discussions will be recorded and will be approximately 60-90 minutes long. All information will be kept confidential. Refreshments will be served and you will be given a pen and parcel of healthy snacks as a token of appreciation.

Are you interested in taking part?

☐ ***No*** – Thank you for your time. Have a lovely day.

☐ ***Yes*** – (Ask next question)

Before we continue I have to know if you have any formal training in nutrition.

☐ ***Yes*** – Thank you for your time. Unfortunately, any formal training in nutrition excludes you from the study. Have a lovely day.

☐ ***No*** – (Ask next question)

Are you a permanent resident of this area?

☐ ***No*** - Thank you for your time. Unfortunately, that excludes you from the study. Have a lovely day.

☐ ***Yes*** – What day and time suits you best for the discussions?

Details of participant:

Name: _____

Telephone number: _____

Address: _____

_____

_____

Area: _____

Completed by: _____

Addendum C: Community recruitment form

RECRUITMENT FORM COMMUNITY

Code: RFC_____

Good morning / Good afternoon

We are looking for volunteers for a research project who are mothers/caregivers over the age of 18 years of children between the ages of 0-5 years. Are you such a person?

No – Thank you for your time. Have a lovely day.

Yes – (Continue)

We are conducting a study to determine the appropriateness and understanding of the new Paediatric Food-Based Dietary Guidelines amongst mothers/caregivers of children aged 0-5 years. In order to gain this information, we will be having group discussions with other mothers/caregivers. You will be expected to discuss and share opinions on certain questions with the other group members. The discussions will be recorded and will be approximately 60-90 minutes long. All information will be kept confidential. Refreshments will be served and you will be given a pen and parcel of healthy snacks as a token of appreciation.

Are you interested in taking part?

No – Thank you for your time. Have a lovely day.

Yes – (Ask next question)

Before we continue I have to know if you have any formal training in nutrition.

Yes – Thank you for your time. Unfortunately, any formal training in nutrition excludes you from the study. Have a lovely day.

No – (Ask next question)

Are you a permanent resident of this area?

☐ ***No*** - Thank you for your time. Unfortunately, that excludes you from the study. Have a lovely day.

☐ ***Yes*** – What day and time suits you best for the discussions?

Details of participant:

Name: _____

Telephone number: _____

Address: _____

_____

_____

Area: _____

Permanently

Completed by: _____

Addendum D

WOULD YOU LIKE TO GIVE YOUR OPINION ABOUT A SET OF GUIDELINES ON BABY AND CHILD NUTRITION?

PLEASE JOIN OUR FOCUS GROUP DISCUSSION!

AREYOU:

- A MOTHER/CAREGIVER OF A CHILD BETWEEN THE AGES OF 0-5 YEARS
- OLDER THE AGE OF 18 YEARS
- LIVING IN THIS AREA PERMANENTLY
- ABLE TO SPEAK ENGLISH, AFRIKAANS OR ISIXHOSA

Please consider this invitation!

DATE: _____ **PLACE:** _____ **TIME:** _____

For more information: Please call: _____

Addendum E: Self-administered questionnaire for caregivers

SELF ADMINISTERED QUESTIONNAIRE FOR CAREGIVERS

Code: CG_____

INSTRUCTIONS:

a) Please answer all of the questions.

b) Please complete the questionnaire below by ticking the appropriate box, circling the most appropriate number or writing the answer in the space provided.

Suburb: _____

Date (dd/mm/yyyy): _____

DEMOGRAPHIC INFORMATION:

1) Date of Birth (dd/mm/yyyy): _____

2) Ethnicity: ☐ White ☐ Coloured ☐ Asian
☐ Black ☐ Indian ☐ Other _____

3) Home language:
☐ English
☐ Afrikaans
☐ isiXhosa

4) Highest level of education:
☐ None
☐ Grade 1 – Grade 7
☐ Grade 8 – Grade 11
☐ Matric
☐ Tertiary education

5) Employment status:
☐ Employed
☐ Unemployed

6) Relation to child:

- ☐ Mother
- ☐ Sibling
- ☐ Grandmother
- ☐ Aunt
- ☐ No relation
- ☐ Other (specify): _____

Addendum F: Informed consent form

PARTICIPANT INFORMATION LEAFLET AND CONSENT FORM

TITLE OF THE RESEARCH PROJECT:

Field testing of the revised Paediatric Food-Based Dietary Guidelines amongst mothers/caregivers of children aged 0-5 years in the Western Cape Province, South Africa

REFERENCE NUMBER: N14/09/122

PRINCIPAL INVESTIGATOR: LM du Plessis

ADDRESS: Tygerberg Medical Campus, Francie van Zijl Drive, Stellenbosch University, Parow, Cape Town, 7505

CONTACT NUMBER:

You are being invited to take part in a research project. Please take some time to read the information presented here, which will explain the details of this project. Please ask the study staff or doctor any questions about any part of this project that you do not fully understand. It is very important that you are fully satisfied that you clearly understand what this research is about and how you could be involved. Also, taking part in this study is **entirely voluntary,** which means that you do not have to take part if you do not want to. If you say no, this will not affect you negatively in any way whatsoever. You are also free to pull out from the study at any point, even if you do agree to take part.

This study has been approved by the **Health Research Ethics Committee at Stellenbosch University** and will be carried out according to the ethical guidelines and principles of the international Declaration of Helsinki, South African Guidelines for Good Clinical Practice and the Medical Research Council (MRC) Ethical Guidelines for Research.

What is this research study all about?

The research study will look at the appropriateness and understanding of the new Paediatric Food-Based Dietary Guidelines amongst mothers/caregivers of children aged 0-5 years. A number of focus groups, consisting of 6-8 people, will be held in the Western Cape Province where these guidelines will be discussed.

Why have you been invited to participate?

You have been invited to participate because you are a mother/caregiver of a child between the ages of 0-5 years and you do not have any formal training in nutrition.

What will your responsibilities be?

You will be expected to attend a 2 hour focus group discussion where the paediatric food based dietary guidelines will be discussed. You will also be asked socio-demographic questions during this session.

Will you benefit from taking part in this research?

You will not benefit directly from taking part in this study. However, your contribution may assist in the final development of an educational tool for improving child health in South Africa.

Are there in risks involved in your taking part in this research?

There are no risks involved.

If you do not agree to take part, what alternatives do you have?

You will not be disadvantaged if you choose not to take part in this study.

Who will have access to your medical records?

Your medical records are not applicable to this study therefore no one will have access to them.

What will happen in the unlikely event of some form injury occurring as a direct result of your taking part in this research study?

No injury could occur as a direct result of you taking part in this study.

Will you be paid to take part in this study and are there any costs involved?

No, you will not be paid to take part in the study. There will be no costs involved for you, if you do take part. Refreshments, such as tea, coffee and muffins, will be served at all discussions, during comfort breaks. You will receive a pen and parcel consisting of healthy snacks (e.g. fresh/dried fruit and yoghurt) as a token of appreciation for taking part in the study.

Is there anything else that you should know or do?

All collected information will be strictly confidential. A audio recording will be made but privacy is ensured. If the data is used in a publication or thesis, your identity will remain anonymous.

You can contact the Health Research Ethics Committee at 021-938 9207 if you have any concerns or complaints that have not been adequately addressed. You will receive a copy of this information and consent form for your own records.

INFORMED CONSENT TO TAKE PART IN THE RESEARCH STUDY

Declaration by participant

By signing below, I …… agree to take part in a research study entitled *(Field testing of the revised Paediatric Food-Based Dietary Guidelines amongst mothers/caregivers of children aged 0-5 years in the Western Cape Province, South Africa)*.

I declare that:

- I have read or had read to me this information and consent form and it is written in a language which I understand and feel comfortable with.
- I have had a chance to ask questions and all my questions have been adequately answered.
- I understand that taking part in this study is **voluntary** and I have not been pressurised to take part.
- I may choose to leave the study at any time and nothing bad will happen to me. I will not be discriminated against in any way.
- I may be asked to leave the study before it has finished, if the study doctor or researcher feels it is in my best interest, or if I do not follow the study plan, as agreed to.

Signed at (*place*) .....…..…… on (*date*) ……...…….. 2017.

Signature of participant **Signature of witness**

Declaration by investigator

I *(name)* ……..…… declare that:

- I explained the information in this document to ……..
- I encouraged him/her to ask questions and took adequate time to answer them.
- I am satisfied that he/she adequately understands all aspects of the research, as discussed above
- I did/did not use an interpreter. (*If an interpreter is used then the interpreter must sign the declaration below.*

Signed at (*place*) .....….....…… on (*date*) ……...…….. 2017.

Signature of investigator **Signature of witness**

Declaration by interpreter

I *(name)* ……..…… declare that:

- I assisted the investigator (*name*) …… to explain the information in this document to (*name of participant*) ……..…….. using the language medium of Afrikaans/Xhosa.
- We encouraged him/her to ask questions and took adequate time to answer them.
- I conveyed a factually correct version of what was related to me.

- I am satisfied that the participant fully understands the content of this informed consent document and has had all his/her question satisfactorily answered.

Signed at (*place*) .....…..……. on (*date*) ……...…….. 2017.

Signature of interpreter **Signature of witness**

INFORMED CONSENT FOR VIDEO/AUDIO RECORDING

The purpose of the meeting and the handling, use and final destruction of the recordings, have been explained to me. The researcher has offered to answer any of my questions relating to the procedure of the recording. I understand the explanation and I have been given a copy of this form for my records.

Signed at (*place*) .....…..……. on (*date*) ……...…….. 2017.

.....	.....
Name of participant	Signature of participant
.....	.....
Name of witness	Signature of witness
.....	.....
Name of investigator	Signature of investigator

Addendum G: Focus group discussion guide

SECTION THREE: 3-5 YEARS

1) Enjoy a variety of foods

- Have you heard about or read this guideline before?
    - If yes, where?
- What do you understand by this guideline?
    - What does the word “variety” mean to you?
- Do you think it is important to enjoy a variety of foods?
    - Yes – why?
    - No – why?
- Do you and your family enjoy a variety of foods?
    - No – why?
- Do you think you will be able to follow this guideline?
    - Yes – why?
    - No – why?
- Do you think the general public will be able to understand this guideline?
    - Yes – why?
    - No – why?
- How would you re-word this guideline to make it more understandable to the general public?

2) Make starchy foods part of most meals

- Have you heard about or read this guideline before?
    - If yes, where?
- What do you understand by this guideline?
    - What does the phrase “starchy foods” mean to you?
    - What does the phrase “part of most meals” mean to you?
- Do you think it is important to make starchy foods part of most meals?
    - Yes – why?
    - No – why?
- Do you and your family make starchy foods part of most meals?
    - No – why?

- Do you think you will be able to follow this guideline?
    - Yes – why?
    - No – why?
- Do you think the general public will be able to understand this guideline?
    - Yes – why?
    - No – why?
- How would you re-word this guideline to make it more understandable to the general public?

3) Lean chicken or lean meat or fish or eggs can be eaten every day

- Have you heard about or read this guideline before?
    - If yes, where?
- What do you understand by this guideline?
- What does the word 'lean' mean to you?
- Do you think it is important to give your child lean chicken or lean meat or fish or eggs can be eaten every day?
    - Yes – why?
    - No – why?
- Do you and your family eat lean chicken or lean meat or fish or eggs every day?
    - No – why?
- Do you think you will be able to follow this guideline?
    - Yes – why?
    - No – why?
- Do you think the general public will be able to understand this guideline?
    - Yes – why?
    - No – why?
- How would you re-word this guideline to make it more understandable to the general public?

4) Eat plenty of vegetables and fruit every day

- Have you heard about or read this guideline before?
    - If yes, where?

- What do you understand by this guideline?
    - What does the word “plenty” mean to you?
- Do you think it is important to give your child plenty of vegetables and fruit every day?
    - Yes – why?
    - No – why?
- Do you and your family eat plenty of vegetables and fruit every day?
    - No – why?
- Do you think you will be able to follow this guideline?
    - Yes – why?
    - No – why?
- Do you think the general public will be able to understand this guideline?
    - Yes – why?
    - No – why?
- How would you re-word this guideline to make it more understandable to the general public?

5) Eat dry beans, split peas, lentils and soya regularly

- Have you heard about or read this guideline before?
    - If yes, where?
- What do you understand by this guideline?
    - What does the word “regularly” mean to you?
- Do you think it is important to give your child dry beans, split peas, lentils and soya regularly?
    - Yes – why?
    - No – why?
- Do you and your family eat dry beans, split peas, lentils and soya regularly?
    - No – why?
- Do you think you will be able to follow this guideline?
    - Yes – why?
    - No – why?
- Do you think the general public will be able to understand this guideline?
    - Yes – why?

- No – why?

- How would you re-word this guideline to make it more understandable to the general public?

Break for refreshments – 15 minutes

6) Consume milk, maas or yoghurt every day

- Have you heard about or read this guideline before?
  - If yes, where?
- What do you understand by this guideline?
- What does the word 'maas' mean to you?
- Do you think it is important to give your child milk, maas or yoghurt every day?
  - Yes – why?
  - No – why?
- Do you and your family drink milk, maas or yoghurt every day?
  - No – why?
- Do you think you will be able to follow this guideline?
  - Yes – why?
  - No – why?
- Do you think the general public will be able to understand this guideline?
  - Yes – why?
  - No – why?
- How would you re-word this guideline to make it more understandable to the general public?

7) Feed your child regular small meals and healthy snacks

- Have you heard about or read this guideline before?
  - If yes, where?
- What do you understand by this guideline?
  - What does the word "regular" mean to you?
  - What does the phrase "small meals" mean to you?

    - What does the phrase “healthy snacks” mean to you?
- Do you think it is important to give your child regular small meals and healthy snacks?
    - Yes – why?
    - No – why?
- Do you and your family eat regular small meals and healthy snacks?
    - No – why?
- Do you think you will be able to follow this guideline?
    - Yes – why?
    - No – why?
- Do you think the general public will be able to understand this guideline?
    - Yes – why?
    - No – why?
- How would you re-word this guideline to make it more understandable to the general public?

8) Use salt and foods high in salt sparingly

- Have you heard about or read this guideline before?
    - If yes, where?
- What do you understand by this guideline?
    - What does the phrase “foods high in salt” mean to you?
    - What does the word “sparingly” mean to you?
- Do you think it is important to use salt and foods high in salt sparingly?
    - Yes – why?
    - No – why?
- Do you and your family use salt and foods high in salt sparingly?
    - No – why?
- Do you think you will be able to follow this guideline?
    - Yes – why?
    - No – why?
- Do you think the general public will be able to understand this guideline?
    - Yes – why?
    - No – why?

- How would you re-word this guideline to make it more understandable to the general public?

9) Use fats sparingly. Choose vegetable oils, rather than hard fats

- Have you heard about or read this guideline before?
    - If yes, where?
- What do you understand by this guideline?
    - What does the word “sparingly” mean to you?
    - What does the phrase “vegetable oils” mean to you?
    - What does the phrase “hard fats” mean to you?
- Do you think it is important to use fats sparingly?
    - Yes – why?
    - No – why?
- Do you and your family use fats sparingly?
    - No – why?
- Do you think you will be able to follow this guideline?
    - Yes – why?
    - No – why?
- Do you think the general public will be able to understand this guideline?
    - Yes – why?
    - No – why?
- How would you re-word this guideline to make it more understandable to the general public?

10) Use sugar and food and drinks high in sugar sparingly

- Have you heard about or read this guideline before?
    - If yes, where?
- What do you understand by this guideline?
    - What does the phrase “food and drinks high in sugar” mean to you?
    - What does the word “sparingly” mean to you?
- Do you think it is important to use sugar and food and drinks high in sugar sparingly?
    - Yes – why?

- No – why?

- Do you and your family use sugar and food and drinks high in sugar sparingly?
  - No – why?
- Do you think you will be able to follow this guideline?
  - Yes – why?
  - No – why?
- Do you think the general public will be able to understand this guideline?
  - Yes – why?
  - No – why?
- How would you re-word this guideline to make it more understandable to the general public?

11) Drink lots of clean, safe water and make it your beverage of choice

- Have you heard about or read this guideline before?
  - If yes, where?
- What do you understand by this guideline?
  - What does the word “lots” mean to you?
  - What does the phrase “clean, safe water” mean to you?
- Do you think it is important to drink lots of clean, safe water and make it your beverage of choice?
  - Yes – why?
  - No – why?
- Do you and your family drink lots of clean, safe water and make it your beverage of choice?
  - No – why?
- Do you think you will be able to follow this guideline?
  - Yes – why?
  - No – why?
- Do you think the general public will be able to understand this guideline?
  - Yes – why?
  - No – why?

- How would you re-word this guideline to make it more understandable to the general public?

12) Be active!

- Have you heard about or read this guideline before?
    - If yes, where?
- What do you understand by this guideline?
    - What does the word “active” mean to you?
- Do you think it is important to be active?
    - Yes – why?
    - No – why?
- Do you and your family stay active?
    - No – why?
- Do you think you will be able to follow this guideline?
    - Yes – why?
    - No – why?
- Do you think the general public will be able to understand this guideline?
    - Yes – why?
    - No – why?
- How would you re-word this guideline to make it more understandable to the general public?

13) Hands should be washed with soap and clean water before preparing or eating food

- Have you heard about or read this guideline before?
    - If yes, where?
- What do you understand by this guideline?
    - What does the phrase “clean water” mean to you?
- Do you think it is important to wash hands with soap and clean water before preparing or eating food?
    - Yes – why?
    - No – why?

- Do you and your family wash your hands with soap and clean water before preparing or eating food?
    - No – why?
- Do you think you will be able to follow this guideline?
    - Yes – why?
    - No – why?
- Do you think the general public will be able to understand this guideline?
    - Yes – why?
    - No – why?
- How would you re-word this guideline to make it more understandable to the general public?

Closing

I would like to thank you all again for participating in today's session.